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ALRT Impact Assessment Baseline Travel Survey

Summary Report

Prepared for
Transportation
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by
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and
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DECEMBER 1987

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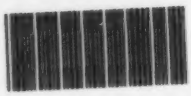

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ALRT IMPACT ASSESSMENT

BASELINE TRAVEL SURVEY

SUMMARY REPORT

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December 1987

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17. Abstract

SkyTrain has been operating in the Vancouver region since January, 1986. As SkyTrain represents a major change in transportation service levels in the region, it is expected that travel patterns will undergo significant change over time. Determining the impact of SkyTrain on the distribution of automobile and transit trips would have a practical application in the future planning of rail transit projects in Vancouver and Canada as a whole.

The Advanced Light Rapid Transit (ALRT) Impact Assessment Baseline Travel Survey was undertaken from September to November 1985 to provide a description of travel patterns in the Vancouver region prior to SkyTrain. The project components included a home interview survey of over 25,000 households, a trip diary administered to approximately 1,700 households, traffic screenline counts, an external cordon survey, a taxi survey, a survey of trips for work or business purposes, a survey of SkyTrain riders and an inventory of parking near SkyTrain stations.

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17. Résumé

Le système SkyTrain fonctionne dans la région de Vancouver depuis janvier 1986. Comme il représente un changement majeur en fait de niveau de service, il bouleversera sans doute les habitudes de transport connues jusqu'ici. Il a été estimé utile, sur le plan de la planification des systèmes de transport légers sur rail tant à Vancouver que partout au Canada, de vérifier l'impact du SkyTrain sur la distribution des déplacements privés et collectifs.

Ce rapport rend compte de l'enquête faite entre septembre et novembre 1985 pour déterminer les habitudes de déplacement dans la région de Vancouver avant la mise en service du SkyTrain, dans le cadre d'une Etude sur l'impact des systèmes de transport légers de type avancé. Les éléments de cette recherche ont été les suivants: sondage auprès de plus de 25 000 foyers, un carnet des déplacements remis à quelque 1 700 ménages, des comptages de la circulation, une enquête cordon, une enquête taxi, une enquête sur les déplacements pour travail ou affaires et enfin une auprès des clients du SkyTrain et un comptage des places de stationnement à proximité des stations SkyTrain.

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1. INTRODUCTION

1.1 The SkyTrain System

In January 1986, SkyTrain began revenue service to serve travel demand in one of the area's most heavily-used corridors and bring visitors to and from the site of Expo 86. The SkyTrain system was intended to be a demonstration of the finest in Canadian advanced light rapid transit technology (ALRT).

As the backbone of the transit system in the Vancouver area, the 21.4 km SkyTrain Phase I line (Figure 1) connects downtown Vancouver with the suburban municipalities of Burnaby and New Westminster. The lightweight, linear-induction-powered vehicles operate on a primarily elevated guideway, with some at-grade sections and a tunnel section in downtown Vancouver. The system is fully integrated with bus services and most of the fifteen stations on the line have adjacent bus loops and auto drop-off facilities.

SkyTrain is a fully automated system with driverless trains. Service operates for approximately 19 hours a day using two to four car trains at frequencies of 3-5 minutes. During the Expo 86 World's Fair, SkyTrain carried up to 120,000 passengers daily but post-Expo ridership has stabilized at approximately 55,000 per weekday.

1.2 Background

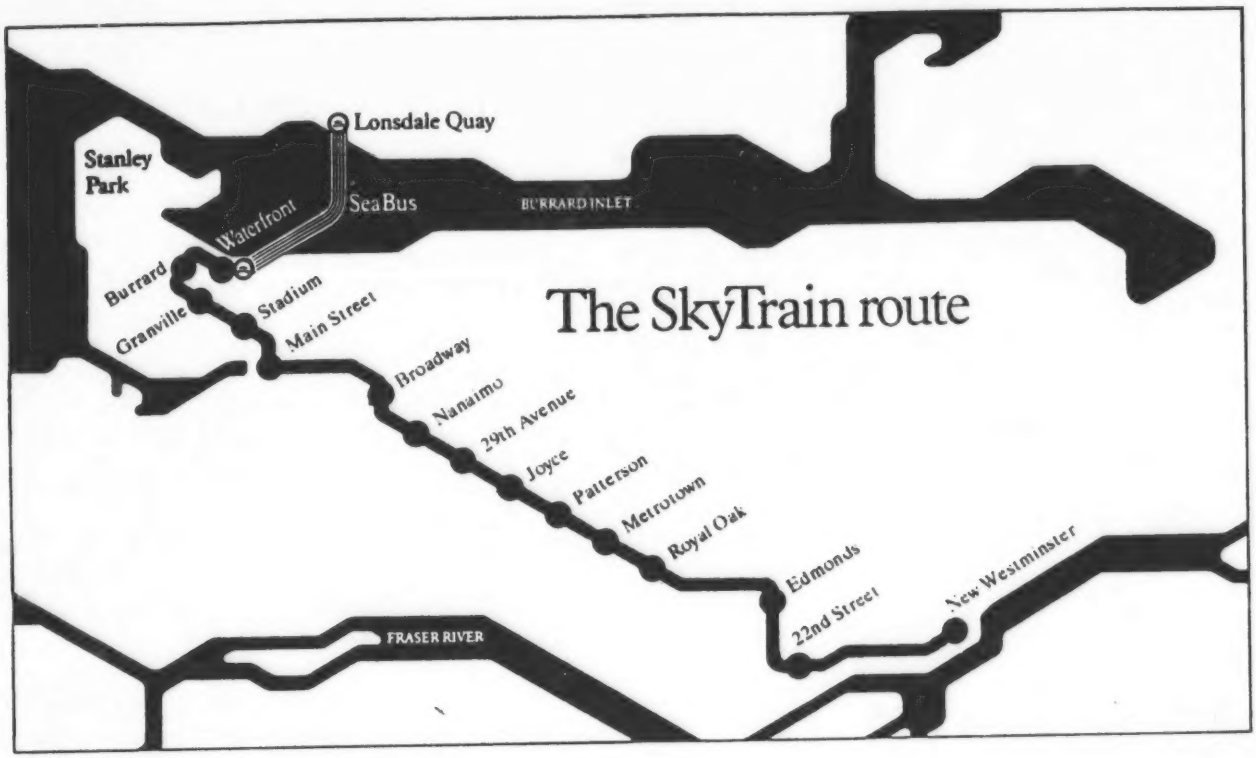
1.2.1 The Requirement for an Assessment of SkyTrain's Impact

Effective planning and funding decisions for urban transportation systems requires reliable data on where people are coming from, where people are going to, how they are getting there and when they travel. The lack of reliable information on urban travel in the metropolitan Vancouver area has been of considerable concern to various transportation agencies including BC Transit and the Greater Vancouver Regional District (GVRD) and its member municipalities.

In 1983, BC Transit was assessing the need for an on-board survey of transit riders to obtain current information for service planning and marketing. It was concluded that a comprehensive survey of trips by all modes in the region could be more useful and cost-effective than an updated on-board transit survey.

The impetus to proceed with a comprehensive survey of travel in the Vancouver region, however, was the development of SkyTrain. In view of the extensive involvement of government in the planning and implementation of the SkyTrain, both Transport Canada and BC Transit wished to undertake an assessment of SkyTrain's impact on the Vancouver region. The impact assessment would require a comprehensive description of "baseline" travel patterns prior to the introduction of SkyTrain. In late 1983 BC Transit commissioned McLaren Plansearch to develop terms of reference for a comprehensive impact assessment of ALRT.[1] The study design published in April 1984 proposed a longitudinal study to be carried out over a ten year period from 1985 to 1995 including a broad range of impact areas.

Figure 1
SkyTrain Route



1.2.2 Initial Planning

Subsequently, in the fall of 1984 the Greater Vancouver Regional District initiated discussions with BC Transit to develop a proposal for a regional travel survey which would meet both objectives of providing a comprehensive travel database for regional and municipal transportation planning and baseline data for assessing the impact of SkyTrain. A feasibility study[2] and work program completed in March 1985 proposed that the regional travel survey be undertaken in the Fall of 1985 prior to the opening of SkyTrain in January 1986. This timing would ensure that the data would be representative of travel patterns prior to the introduction of SkyTrain and would not be influenced by the unusual travel demands of Expo 86.

Approval of federal funding for the ALRT Impact Assessment in early 1985 ensured BC Transit's participation in the amount of $280,000, cost shared 50% by Transport Canada. Subsequent Greater Vancouver Regional District approval of $355,000 over two years as their part of the budget provided a total allocation of approximately $635,000 for the project. Since the federal and provincial contributions were derived from the ALRT Impact Assessment, it was necessary to engage the Greater Vancouver Regional District as a subcontractor to the ALRT Impact Assessment. The result was a three party agreement to organize, fund and carry out a comprehensive set of regional travel surveys within the Vancouver Census Metropolitan Area (CMA). The CMA is shown in Figure 2.

1.3 Impact Assessment Components

1.3.1 Metropolitan Vancouver Origin-Destination Survey

The Metropolitan Vancouver Origin-Destination Survey was undertaken from September to December 1985. The objective of the survey was to obtain a representative sample of travel, by all modes, for all purposes, for a typical 24-hour period. It included the following components:

(a) telephone survey - telephone interviews of approximately 25,000 households;

(b) trip diary - approximately 1700 households completed a detailed three day diary of all trips taken by each member;

(c) taxi survey - a single day survey of taxi trips;

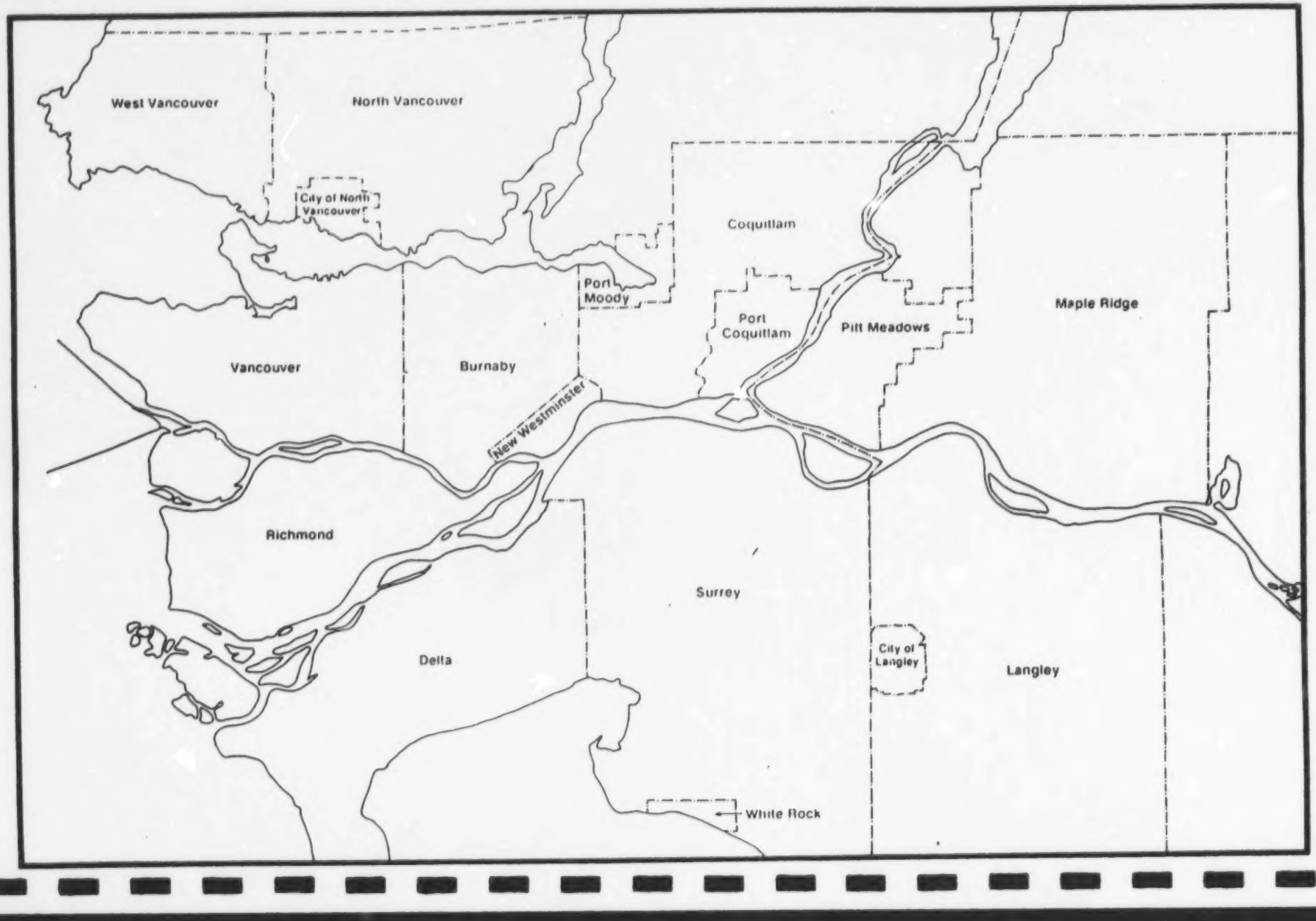
(d) external cordon survey - a survey of trips into and out of the metropolitan area using questionnaires distributed at major entry/exit points;

(e) screenline counts - vehicle counts and transit load counts at locations throughout the region;

(f) survey of travel for work and business purposes.

Figure 2

Vancouver Census Metropolitan Area



1.3.2 SkyTrain Rider Survey

A survey of SkyTrain riders was undertaken during the week of March 23-27, 1987. The objectives of the SkyTrain Rider Survey are summarized as follows:

(a) to identify the travel patterns of SkyTrain riders in terms of origins, destinations, access mode, walking distance and usage frequency.

(b) to determine the impact of SkyTrain on travel behaviour. Respondents were surveyed concerning their mode choice prior to SkyTrain, car availability, impact on rider's residential location and shopping habits.

(c) to solicit public attitudes towards SkyTrain generally and also specifically in the areas of reliability, speed, noise, safety, transferring, ticket vending machine use, etc.

Questionnaires were distributed at stations to all inbound (westbound) riders from the start of service to the end of service each day during the week of the survey.

1.3.3 SkyTrain Parking Inventory

A baseline parking inventory was undertaken in November and December, 1985 immediately prior to the start of revenue service on SkyTrain and subsequently in March 1986 after three months of SkyTrain service. The purpose of the inventory was to provide information on parking availability and utilization within SkyTrain station areas before and after SkyTrain was in operation.

1.4 Report Organization

Section 2 describes the preparatory activities for each survey component. The data collection process is also outlined and the follow-up activities of data entry, editing and geocoding are described.

Section 3 presents selected results of the major survey components.

Section 4 outlines how survey data will be used to establish "baseline" measures against which future (post-SkyTrain) survey results can be compared to determine the impact of SkyTrain.

Section 5 offers some concluding comments.

2. SURVEY PROCESS

2.1 Telephone Interview Survey

2.1.1 Overview

The telephone interview method was chosen as the principal instrument for the travel survey over alternative methods such as roadside interviews or employer-based surveys. It was determined that the telephone interviews would be conducted throughout the Greater Vancouver Census Metropolitan Area (CMA) and that completed interviews from 25,000 households would be set as a target. A completed interview was defined as being when one or more non-child members of a household provided data on the travel, over the previous calendar day, of all household members.

2.1.2 Survey Design

2.1.2.1 Sampling Strategy

According to GVRD estimates, the Greater Vancouver CMA contained approximately 522,000 households with 1.35 million people in 1985. The Vancouver CMA is almost contiguous with the Vancouver Toll Free dialing area, thus minimizing potential telephone interview costs. Moreover, it encompasses the majority of metropolitan travel in Vancouver, thus reducing the survey requirements for external cordon surveys.

With the cooperation of BC Telephone, it was possible to draw a sample of listed telephone numbers from each of its exchange areas (eg. 438-xxxx) in proportion to the known population in each exchange area. A total of 57,522 numbers were randomly selected from their master list of telephone subscribers. This number was based on the assumption of a 60% response rate and a requirement for an additional 3,500 households for the trip diary sample.

Completed interviews were obtained from approximately 25,180 households providing data on approximately 170,000 trips made by 67,200 people. This total constitutes a 4.8% sample of all households in the Vancouver CMA.

2.1.2.2 Interview Content

The coding form (actual size 11 inches by 14 7/8 inches) used by the telephone interviewers is shows in the Appendix page A-1. The form proved to be easy to use by interviewers and keypunchers, helping to minimize problems and errors in these tasks. The form also shows which data was collected and how it was recorded. Table 1 summarizes the household and trip information obtained in or derived from the interview. A trip is a journey for a single purpose; trip segments typically involve changes of mode while continuing to pursue the same trip purpose.

Household and Personal Data	Trip Data
Size of household # of vehicles in household # of employed persons in household Age of each household member Sex of each household member Municipality of residence Traffic zone of residence Postal code zone of residence Telephone exchange of residence Date for which data provided Day of week for which data provided	Person making trip Trip and trip segment number Purpose of trip Mode of trip segment Time of trip start Driver/passenger Bus routes used UTM of origin, destination Municipality of trip segment ends Traffic zone of trip segment ends Type of origin, destination (i.e. landmark, intersection, specific address)

TABLE 1
Telephone Interview Data Content

2.1.3 Public Relations Activities

Community awareness and support of the travel survey was viewed as necessary to maximize the response rate. It was decided to focus the media campaign on local newspapers to minimize expense while ensuring broad coverage and giving a local flavour to the survey. A second tactic was to inform other public agencies and senior government officials so that they could respond to queries concerning the legitimacy of the survey.

2.1.4 Interviewing Progress

The telephone interview survey was initiated on September 10, 1985 and concluded in early December 1985.

Interviews were preceded by a "personalized" letter with the name and address of the telephone subscriber on a pre-printed letter. Letters were scheduled to arrive at the respondent's address approximately three days prior to the telephone call.

Telephone interviews were conducted during weekday evenings and on Saturday afternoons seeking information about trips over the previous 24-hour day. Interviews were conducted by a supervisor and four teams of six interviewers operating from 4:45 pm to 9:45 pm Tuesday to Friday and 10:00 am to 3:00 pm on Saturdays. Ultimately, 5,650 interview hours were required over a 12 week period. Table 2 summarizes the progress of the survey.

Time Period	Completed Forms	Incomplete Forms	Total Forms	Response Rate
First two weeks	3,028	2,062	5,090	59.5%
First four weeks	6,780	4,728	11,508	58.9%
First six weeks	11,847	7,792	19,139	59.3%
End of survey	25,180	17,610	42,790	58.8%

TABLE 2
Interviewing Progress

Interviewer productivity improved progressively over the 12-week survey period. Completions per interview hour went from about 3.2 in the first weeks to over 5.0 in the final weeks. Sample aging as demonstrated by disconnected or changed telephone numbers was not a major problem, increasing from about 5% of households to about 7% over the survey period. Completion rates (60%), refusals to participate (20%), "non response" numbers after three calls (14%) and insurmountable language problems (2%) remained fairly constant over the survey period.

Three attempts were made to reach a household, after which that household was declared a "non response". Of the completed interviews, 65% were reached on the first attempt, 24% on the second and 11% on the third. Since only three attempts were made, it might be posited that the survey missed "heavy travellers" who would be rarely at home to answer their phones. If this was the case, a direct relationship should also be expected between trip rates per household and the number of calls required before successful contact was made. The survey results showed no such direct relationship.

2.1.5 Data Processing

2.1.5.1 Data Entry

An indirect "paper" recording format for data was used. The paper forms were then subjected to an immediate edit and check for completeness, leading to an immediate call back, if necessary. A data entry firm was responsible for entering the data onto an industry standard tape. The tape was then taken to the GVRD for automated verification of the data fields, to check for blank fields, anomalous responses, internal consistency, etc.

2.1.5.2 Geocoding

The feasibility study referred to in Section 1.2.3 had proposed precise geocoding of trips and trip segment ends. Geocoding located each trip end by its exact geographical location using Universal Transverse Mercator (UTM) coordinates. The fixing of UTM coordinates enables the survey data to be "repackaged" into different spatial systems, if required in the future.

Trip ends could be specified as landmarks/monuments, as intersections, or as specific addresses. The geocoding process involved computer programs to read the trip ends and search for corresponding names in monument, intersection or address master files. "Matched" trip ends were then assigned the UTM from the corresponding record on the master file. "Unmatched" trip ends were added to the master file. The task was to fix a UTM to every record in the master files so that all trip ends would ultimately find a match and have proper UTM's transferred across. Subsequently, the UTM's were located with the appropriate traffic zone of the GVRD's system of approximately 350 zones.

Approximately 40% of trip ends were the home location, 30% were monuments, 20% were intersections and 5% were specific (non-home) addresses; in about 5% of cases, the trip end location was either unknown to the respondent, the specification was refused or it was not sufficiently precise (e.g. "Downtown"). In many of the cases of imprecise specification, the municipality in which the trip end began or ended was known, and in other cases, it was possible to make a reasonable allocation to traffic zone based on the information given.

2.2 Trip Diary Survey

2.2.1 Purpose

The trip diary was primarily intended to provide more detailed reporting of household travel behaviour than would be attainable through the telephone interview survey. The trip diary complemented the telephone interview in three areas:

(i) by providing a basis to estimate non-response bias in the telephone survey such as that from having a household member report all trips taken by other members.

(ii) by providing detailed reporting of the household characteristics and trip making required to calibrate the trip generation and mode split components of the GVRD's transportation model.

(iii) by providing a profile of the weekly trip making behaviour of a household as a basis for academic research studies of travel behaviour.

2.2.2 Survey Design

2.2.2.1 Diary Content

Compared with the telephone interview survey, additional household-related data collected in the diary survey included residential type and tenure (i.e. own or rent) and data on the household vehicles and their yearly use. Additional personal data included employment status, industry type and annual income. Additional trip-related data included data on parking charges and car availability. The trip diary survey forms are shown in the Appendix pages B-1 and B-2.

2.2.2.2 Sample

The master sample of households to be surveyed was prepared from B C. Tel files in the same way as for the telephone survey. Just over 1700 households participated in the diary survey, providing data on 3700 persons aged six or older who made 37,200 trips spanning a seven day week.

Originally to be a 7-day diary, pre-test results showing under-reporting of trips in the latter days of a seven day diary led to the choice of a 3-day diary. Three sets of diaries were used to cover the seven days of a week: one set of diaries covered Monday, Tuesday, and Wednesday; the second covered Wednesday, Thursday, Friday; and the third covered Friday, Saturday, Sunday resulting in an overlap on Wednesdays and Fridays.

2.2.3 Data Collection

2.2.3.1 Process

The trip diary survey was initiated simultaneously with the telephone interview survey. Each week, pre-interview letters to 340 households (10% of the 3,400 master sample) were personalized and mailed. These letters explained the general nature of the survey and informed householders that they would be receiving a telephone call.

Approximately one week later, an interviewer would call to explain the nature of the study and request the household's cooperation. A chance to participate in a draw for a season's pass to EXPO 86 was offered as an incentive for households submitting completed diaries.

If the household agreed to participate, a package with the appropriate number of diaries (one for each person over the age of 5), plus a household information form was sent out to the household. An encouragement call was made during the time period that the diaries were being completed.

Once completed forms were received, the household was sent a "thank you" letter. If no diaries were received, a reminder telephone call was made. If there were any omissions or errors in a diary, the household was to be contacted. Finally, the data was coded and entered into data files.

2.2.3.2 Response

Table 3 provides a summary of the progress of the trip diary survey throughout the survey period.

TABLE 3
Trip Diary Survey Progress

	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10
Preliminary Sample List	340	341	341	341	341	341	341	341	341	352
Refused	17	24	21	20	12	22	30	25	20	16
INITIAL SAMPLE	323	317	320	321	329	319	311	316	321	332
DIARIES RETURNED	190	162	168	175	178	174	170	167	155	153
PERCENT RETURNED	58.8	51.0	52.5	54.5	54.0	54.5	54.5	52.8	48.2	48.0

After the initial telephone calls, approximately 82% of those contacted agreed to participate and were sent diaries.

2.3 External Cordon Surveys

2.3.1 Purpose and Design

External cordon surveys were conducted to measure travel into, out of and within the Vancouver CMA by non-residents. Four different types of external cordon surveys were conducted, with the chosen methods reflecting particular circumstances. Specifically, interviews were conducted at ferry terminals, at U.S. border crossings, at highway stations and at the Vancouver International Airport.

2.3.2 Data Collection

2.3.2.1 Highway Traffic

Apart from a small number of section line roads, there are only three roadways of significance crossing the Greater Vancouver CMA's eastern border, and only one crossing its northern border. With the help of B.C.'s Ministry of Transportation and Highways (MTH), cordon stations were set up at each of these four points at which all or portions of the outbound traffic (depending on traffic levels) could be flagged over and drivers handed a mail-back survey form. The survey form is shown in the Appendix page C-1. Approximately 10,000 survey forms were handed out, with about 2500 usable forms being returned. The time period in which each form was handed out was noted, and expansion factors for returned forms were derived in relation to the traffic count totals past the survey station during the particular period.

2.3.2.2 Ferry Traffic

Surveys of outbound ferry traffic were conducted in the waiting areas of each of the region's two ferry terminals. To obtain sufficient coverage, it was necessary to restrict the amount and type of data to be collected from each vehicle. Drivers were asked to identify the point of origin (on a superzone basis) for their trip to the ferry terminal, to specify their trip's purpose, and to identify their zone of residence. Vehicle type, occupancy and sailing time were noted by the interviewer with control totals for each sailing being provided by the B.C. Ferries Corporation.

2.3.2.3 Border Crossings

With the cooperation of Canadian Customs officials, it was possible to survey vehicles departing across the US-Canada border, the southern boundary of the survey area. As with the ferry surveys, it was necessary to keep the border crossing survey short. With reference to the superzone map, drivers were asked to identify their zone of residence and the zone of their trip's origin. Vehicle occupancy and type and the time were recorded by the interviewer, with control totals for border crossings by time period being provided by Customs staff.

2.3.2.4 Airport Traffic

A survey of passengers flying into and out of the Vancouver International Airport was conducted by Transport Canada. Passengers enplaning and deplaning were asked their origins and destinations within the Vancouver CMA.

2.4 Screenline Volumes, Vehicle Occupancy, Vehicle Classification Surveys

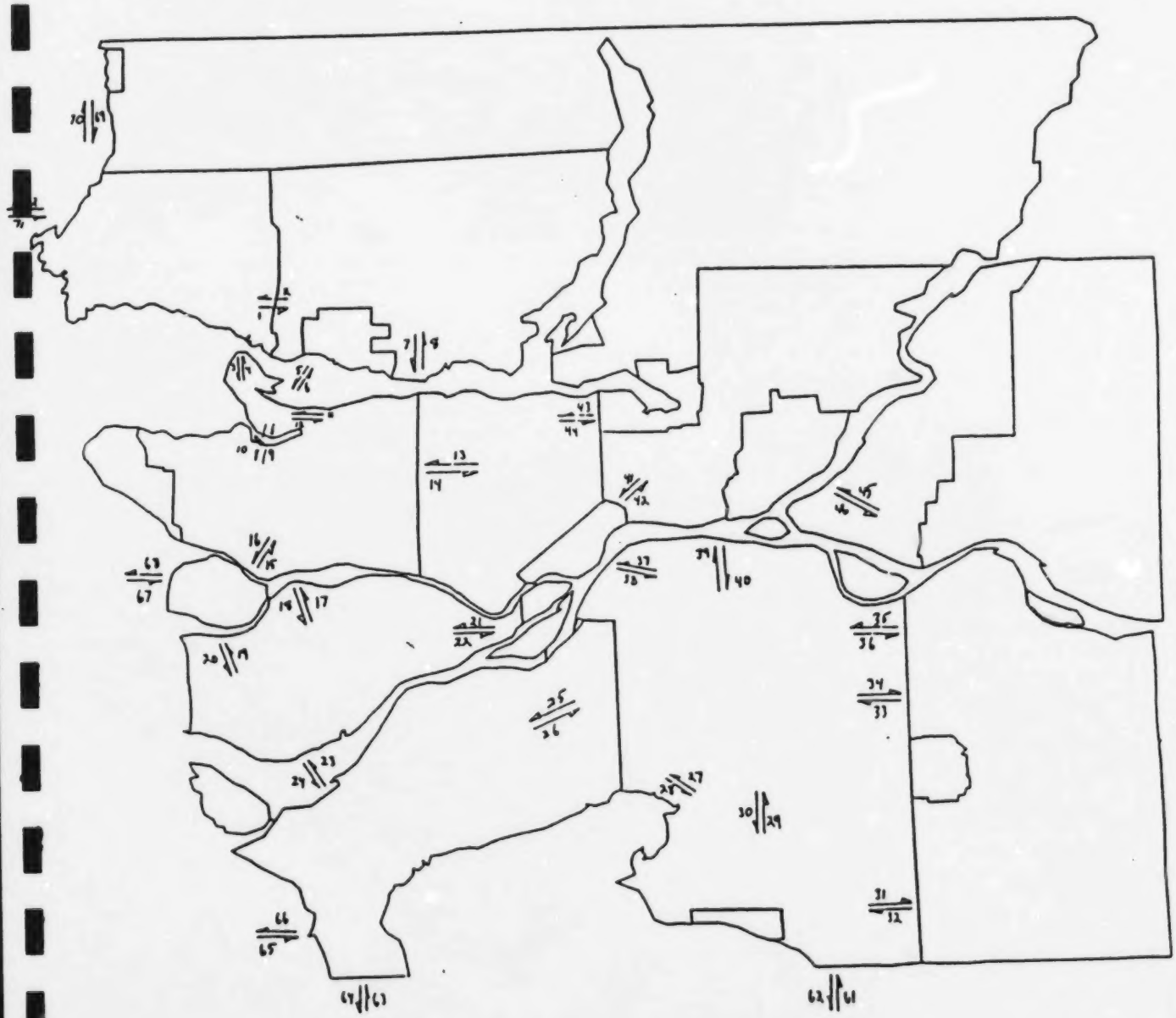
2.4.1 Overview

Classification, occupancy and vehicle counts at key screenline locations are necessary for possible adjustment and factoring of travel survey data, and for the calibration of Greater Vancouver's travel demand model to 1985 conditions. Over 160 counting stations were selected, at over 80 locations at the screenlines between the area's superzones (see Figure 3). The project was coordinated by the GVRD using staff from the municipalities, BC Transit and the Ministry of Transportation and Highways.

2.4.2 Automatic Vehicle Counts

Automatic vehicle counts were taken of all vehicles crossing the screenpoints. Loop counters were available for 32 locations and the remaining stations used hose counters. The loop counters use a magnetic detection system such that axle classification surveys were not required to calculate the number of vehicles at these locations. Hose counters require axle classification surveys. Four-day counts were typically obtained. Average weekday counts from the four days were seasonally adjusted based on the permanent count data.

Figure 3
GVRD Screenlines



2.4.3 Transit Load Counts

Transit loads at all screenpoints were counted by BC Transit checking staff using the standard load checking procedures. This procedure involved on-street load estimation over an 18-hour period. Checking cards were used to record route number, run number, vehicle number and the number of riders on the bus. A total of 52 count stations were covered during the period from mid-October to mid-November.

2.4.4 Vehicle Occupancy and Classification Surveys

Vehicle occupancy and classification surveys were required to calculate vehicles by type and total person trips. As vehicle occupancy and classification would not be expected to vary significantly over the medium term, surveys were limited at specific screenpoints where historical data is available. More extensive surveys were taken at points for which historical data was not available.

Data from the counts and surveys was compiled and aggregated by screenline, time period and mode as shown in the sample report in Figure 4. This example has been reproduced from the G.V.R.D. report "Vehicle and Passenger Screenline Survey" which contains results of the screenline survey. The data is stored on a spreadsheet database and can be aggregated or disaggregated at the user's preference.

2.5 Survey of Travel for Work or Business Purposes

The telephone survey could not collect information on business-related travel by household members employed in the commercial delivery of goods (eg. commercial truckers), messages (eg. couriers and postal employees), or persons (taxi and bus drivers) as well as tradesmen or service personnel. This diversity of business-related travel suggested instead the need for a separate survey.

Since the telephone survey would obtain a representative sample of the region's households, it was felt that it also might provide a sample of the region's commercial travellers. Accordingly, households were "flagged" on the telephone interview form if it was apparent during the telephone interview that one or more persons in the household travelled extensively for work or business purposes and if information on these trips was not being provided by telephone. The households were sent one-day travel diaries, with an inducement to complete and return the diaries. (See Appendix pages D-1 and D-2.) A cut-off date was chosen to ensure that the diaries would be completed during the same period as the other survey components. At the cut-off date, 820 households had been flagged out of 20,369 households that had by then completed interviews.

Figure 4

Sample Screenline Report

1985 GVRD Screenline Station: 128E - PATULLO BRIDGE

Time Begin	Direc-tion	Total Vehicle	Auto	Truck	Taxi	Vehicle Passngr	Transit Passngr	Total Person	Auto Occup	Transit M Split
00:00	N-Bnd	346	346	0	0	98	0	444	1.28	
01:00	N-Bnd	148	148	0	0	36	0	184	1.24	
02:00	N-Bnd	110	110	0	0	21	0	131	1.19	
03:00	N-Bnd	81	81	0	0	13	0	94	1.16	
04:00	N-Bnd	170	170	0	0	19	0	189	1.11	
05:00	N-Bnd	881	852	27	2	116	0	997	1.13	
06:00	N-Bnd	3,522	3,386	127	9	485	367	4,374	1.14	8.39%
07:00	N-Bnd	3,795	3,693	95	7	618	366	4,779	1.16	7.66%
08:00	N-Bnd	3,336	3,193	117	26	519	500	4,355	1.16	11.48%
09:00	N-Bnd	2,205	2,060	144	1	491	193	2,889	1.22	6.68%
10:00	N-Bnd	1,905	1,746	142	17	435	158	2,498	1.23	6.33%
11:00	N-Bnd	1,882	1,717	160	5	493	139	2,514	1.26	5.53%
12:00	N-Bnd	1,782	1,637	135	10	523	86	2,391	1.29	3.60%
13:00	N-Bnd	1,849	1,663	175	11	666	99	2,614	1.36	3.79%
14:00	N-Bnd	2,083	1,929	141	13	580	121	2,784	1.28	4.35%
15:00	N-Bnd	2,295	2,177	103	15	806	181	3,282	1.35	5.51%
16:00	N-Bnd	2,097	1,999	84	14	673	142	2,912	1.32	4.88%
17:00	N-Bnd	1,813	1,757	41	15	724	91	2,628	1.40	3.46%
18:00	N-Bnd	1,734	1,697	33	4	844	78	2,656	1.49	2.94%
19:00	N-Bnd	1,429	1,397	15	17	721	42	2,192	1.50	1.92%
20:00	N-Bnd	1,010	974	26	10	532	33	1,575	1.53	2.10%
21:00	N-Bnd	937	909	20	8	435	48	1,420	1.46	3.38%
22:00	N-Bnd	900	866	18	16	430	40	1,370	1.48	2.92%
23:00	N-Bnd	697	685	6	6	248	19	964	1.36	1.97%
		37,007	35,192	1,609	206	10,526	2,703	50,236	1.28	5.38%
00:00	S-Bnd	743	743	0	0	211	0	954	1.28	
01:00	S-Bnd	381	381	0	0	92	0	473	1.24	
02:00	S-Bnd	194	194	0	0	38	0	232	1.20	
03:00	S-Bnd	116	116	0	0	17	0	133	1.15	
04:00	S-Bnd	79	79	0	0	8	0	87	1.10	
05:00	S-Bnd	114	113	0	1	21	0	135	1.18	
06:00	S-Bnd	530	501	25	4	88	41	659	1.17	6.22%
07:00	S-Bnd	1,516	1,458	48	10	250	184	1,950	1.16	9.44%
08:00	S-Bnd	1,733	1,597	126	10	265	191	2,189	1.15	8.73%
09:00	S-Bnd	1,398	1,210	177	11	276	55	1,729	1.20	3.18%
10:00	S-Bnd	1,479	1,349	122	8	406	77	1,962	1.27	3.92%
11:00	S-Bnd	1,625	1,488	129	8	552	131	2,308	1.34	5.68%
12:00	S-Bnd	1,784	1,613	157	14	518	88	2,390	1.29	3.68%
13:00	S-Bnd	2,003	1,819	167	17	714	146	2,863	1.36	5.10%
14:00	S-Bnd	2,430	2,221	200	9	733	211	3,374	1.30	6.25%
15:00	S-Bnd	3,241	3,118	116	7	814	398	4,453	1.25	8.94%
16:00	S-Bnd	3,453	3,357	87	9	883	451	4,787	1.26	9.42%
17:00	S-Bnd	3,498	3,381	102	15	885	476	4,859	1.25	9.80%
18:00	S-Bnd	3,154	3,067	74	13	1,126	165	4,445	1.36	3.71%
19:00	S-Bnd	1,946	1,871	56	19	931	60	2,937	1.48	2.04%
20:00	S-Bnd	1,332	1,280	36	16	575	79	1,986	1.43	3.98%
21:00	S-Bnd	1,290	1,255	25	10	555	114	1,959	1.43	5.82%
22:00	S-Bnd	1,435	1,399	10	26	489	85	2,009	1.34	4.23%
23:00	S-Bnd	1,189	1,181	2	6	359	31	1,579	1.30	1.96%
		36,663	34,791	1,659	213	10,806	2,983	50,452	1.29	5.91%
		73,670	69,983	3,268	419	21,332	5,686	100,688	1.29	5.65%

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2.6 Taxi Travel Survey

Each of the fourteen taxi fleets in the Vancouver CMA were contacted and requested to collect and provide, for a designated Survey Day, the trip sheets which drivers are obliged to complete. Unfortunately, two fleets refused to participate and in another case, the reliability of the data was suspect. Accordingly, while the collected data is useful as indication of overall taxi use (e.g. average fares per day, average passenger loads), the degree to which it reflects current and future trip patterns is limited. Results from this survey are not included in this report.

2.7 SkyTrain Rider Survey

2.7.1 Questionnaire Design

As the information requirements were too extensive for a single survey form, two questionnaires designated "A" and "B" were used. As shown in the Appendix page E-1 and E-2, each questionnaire contained 16 core questions. Questionnaire A contained additional travel and impact related questions, and Questionnaire B contained additional attitudinal questions.

2.7.2 Collection and Distribution

The questionnaires were distributed at SkyTrain stations to all inbound (westbound) riders from the start of service to the end of service. Rapid transit attendants distributing the questionnaries surveyed an average of three stations per day thereby completing all SkyTrain stations in five days from March 23-27, 1987. A total of 4,015 questionnaires were returned of the 12,535 distributed yielding a response rate of 32%.

2.8 Parking Inventory

The SkyTrain Parking Inventory was conducted to provide baseline information on parking availability and utilization in the vicinity of SkyTrain stations for eventual comparison with post-SkyTrain parking surveys. Field surveys were conducted on weekdays from November 25th to December 11, 1985 within a 500m radius of all 11 SkyTrain stations located outside the downtown core. Post SkyTrain field surveys were to be conducted for two points in time: in March 1986 and in November 1986. This timing was planned to eliminate the impact of Expo 86 on parking demand.

3. SURVEY RESULTS

3.1 Telephone Survey and Trip Diary Results

3.1.1 Sample Validation

The sample validation process compared characteristics of the realized sample originally drawn from listed telephone numbers with that of the CMA as a whole. As shown in Table 4, a close match can be observed between the proportions of households by municipality of residence in the samples from telephone and diary surveys with that of CMA, derived from 1986 Census.

Table 4
Home Locations of Sampled Households

Municipality	Diary Results		Telephone Survey		1986 Census	
	Number	%	Number	%	Number	%
Belcarra	2	0.1	26	0.1	194	0.0
Burnaby	199	11.8	2,791	11.1	58,492	11.0
Coquitlam	78	4.6	1,232	4.9	24,177	4.5
Delta	111	6.6	1,379	5.5	25,010	4.7
Lions Bay	1	0.1	15	0.1	378	0.1
New Westminster	47	2.8	810	3.2	19,421	3.6
N. Vancouver City & District	133	7.9	2,076	8.2	40,607	7.6
Port Coquitlam	30	1.8	522	2.1	9,325	1.7
Port Moody	15	0.9	262	1.0	5,404	1.0
Richmond	118	7.0	1,809	7.2	38,165	7.2
Surrey	211	12.5	2,975	11.8	61,831	11.6
Vancouver	537	31.9	8,254	32.8	187,233	35.1
West Vancouver	41	2.4	749	3.0	15,096	2.8
White Rock	17	1.0	365	1.4	6,985	1.3
Other CMA	145	8.6	1,920	7.6	40,925	7.7
Unknown	19					
Total	1,704	100.0	25,185	100.0	533,247	100.0

Table 5 shows that the age by sex profile of the persons sampled in the telephone survey closely matches the age by sex profile of the overall CMA population, derived from 1986 Census results. Although not shown here, the trip diary respondents' age by sex profile also closely matches those of the telephone sample and CMA population, after adjusting for the fact that children under six years of age were not covered by the diary survey.

Table 5
Age by Sex Profile of
Telephone Survey Sample

AGE GROUP	MALES			FEMALES		
	% SAMPLE		% POPULATION*	% SAMPLE		% POPULATION [1]
	#	%		#	%	
1 - 9 [2]	4061	6.4	6.4	3730	5.9	6.1
10 - 19	4478	7.1	6.5	4179	6.6	6.2
20 - 29	5787	9.1	9.0	5976	9.4	9.2
30 - 39	5718	9.0	8.8	5770	9.1	8.9
40 - 49	3272	6.3	6.2	4003	6.3	6.1
50 - 59	3200	5.0	5.0	3100	4.9	4.9
60 - 69	2701	4.3	3.9	3099	4.9	4.7
70 - 74	814	1.3	1.4	981	1.5	1.9
75+	785	1.2	1.8	1129	1.8	3.0
TOTAL		49.6	49.1		50.4	50.9
NUMBER [3]		31,516	677,545		31,967	703,190

1 From 1986 Census for Vancouver CMA.
2 Age specifications in the survey of 0, 98 or 99 have been treated as "Unknown".
3 In the survey, 1186 male respondents and 1384 females refused to provide their age; 271 respondents provided their age but not their gender; 453 respondents refused on both counts.

Table 6 compares the household size profiles of the realized samples from the telephone and diary surveys with that of the CMA population. Although telephone surveys typically under-sample one-person households, the reason for the low proportion of one-person households in the diary results is not obvious.

Table 6
Percent of Households by Household Size

HOUSEHOLD SIZE	DIARY RESULTS	TELEPHONE SURVEY	VANCOUVER CMA (1981 CENSUS)
1	21.6	22.0	26.9
2	36.4	33.6	31.1
3	16.0	16.5	15.2
4	15.5	17.7	15.8
5	6.5	7.2	7.0
6	2.8	2.1	2.6
7	0.6	0.6	0.7
8+	0.6	0.4	0.6
Avg. Household Size	2.63	2.69	2.66

3.1.2 Composition of Travel

3.1.2.1 Trip Purpose and Travel Mode

Table 7 presents results from the telephone survey which illustrate the composition of travel by Greater Vancouver residents by trip purpose and by travel mode, on a 24-hour basis. Table 7 illustrates the categories of travel mode that, along with "Other" and "Unknown", were provided for in the telephone survey. Note that survey responses related to walk and bicycle trips may not be particularly accurate or representative. (Bike trips are commonly made by children - who were not invited to be interviewed in the telephone survey - and are often "out of sight" of the adult who provided travel data. Walk trips are the most easily forgotten types of trips.) Along with twelve possible travel mode specifications, three travel method specifications were provided for (driver, passenger, unknown), for a total of 36 possible combinations. In the preparation of working data bases, the number of travel mode categories has been reduced to nine, of which auto driver, auto passenger and transit passenger are the three most important. A second refinement of the data was to register the starting mode and ending mode of each trip; in this way, multi-segment trips involving a mode change (e.g. park and ride) can be flagged.

Table 7
Mode Use By Trip Purpose
Vancouver CMA Residents

TRAVEL MODE	TRIP PURPOSE: PERCENT OF TOTAL TRIPS								
	TO WORK	AT WORK	TO SCHOOL	TO LEISURE	TO SHOPPING	TO PERSONAL BUSINESS	TO HOME	TO SERVE PASS	TOTAL
Car	11.4	2.3	3.3	12.7	6.1	3.5	30.3	5.3	74.7
Motorbike	0.1	—	—	—	—	—	0.1	—	0.3
Bicycle	0.1	—	0.4	0.1	—	—	0.7	—	1.4
Lt.Truck	1.2	0.6	0.1	0.8	0.3	0.3	2.2	0.3	5.8
Hvy.Truck	0.1	0.1	—	—	—	—	0.1	—	0.3
Special Bus	—	—	—	—	—	—	0.1	—	0.2
School Bus	—	—	0.3	—	—	—	0.3	—	0.6
Taxi	—	—	—	0.1	—	—	0.1	—	0.3
Walk	0.6	0.1	2.4	0.9	0.6	0.2	4.2	0.1	9.0
Bus	1.6	—	1.0	0.6	0.5	0.3	3.4	—	7.4
Total	15.1	3.0	7.6	15.2	7.5	4.3	41.6	5.7	100.0

Table 7 also illustrates the categories of trip purpose that, along with "Unknown" were provided for in the telephone survey. Note that these nine purposes are essentially "to" purposes (e.g. to work, to school). In the preparation of working data bases, inspections of the trip's origin and/or the previous trip's purpose were made to be able to specify a "from-to" purpose (e.g. from home to shopping), there being 81 possible "from-to" combinations. These combinations can be re-grouped for explanatory or modelling applications.

A GVRD report, "Intermunicipal Travel Patterns" presents tables of reported municipality-to-municipality trips for 14 trip purposes, 3 modes (for auto drivers, transit passengers and total vehicle-based person trips), and for 3 time periods (3-hour AM and PM peak periods and for a 24-hour basis). Table 8 was taken from this report.

All Vehicular Modes

From/To	Belcar	Burn	Coquit	Delta	New W	N Van	Pt Coq	PtMood	Rich'd	Surrey	U E L	Vancou	C B D	W Van	W Rock	MRidge	Langly	Extern	Total
Belcar	512	125	442	88	71	106	175	197	36	202	18	94	71	27	0	75	18	18	2275
Burn	143	150679	19889	4406	20749	8975	3443	3682	8632	13413	2056	59719	15255	2466	636	2909	2786	1345	321183
Coquit	478	19236	63503	1267	7093	1561	10713	8337	1648	5661	265	8531	4915	934	162	4851	1134	570	140859
Delta	106	4441	1201	77829	2704	743	402	339	9247	23682	816	9963	3922	182	908	578	1567	1232	139862
New W	71	20984	6935	2803	32258	915	1681	1208	2747	9523	375	7635	2744	480	269	1769	1538	495	94430
N Van	71	9437	1389	803	864	127279	562	201	2439	1966	1778	18500	15936	17664	54	315	465	1221	200946
Pt Coq	73	3687	10675	400	1697	533	24299	1845	404	1854	126	2735	1507	129	0	3144	448	135	53793
PtMood	175	3791	8406	261	1214	160	1677	6789	464	922	60	1686	1199	134	16	1088	225	113	28455
Rich'd	250	7995	1407	9290	2759	2223	530	352	165329	7740	1929	42819	11279	1325	688	370	1711	879	259661
Surrey	36	13470	5657	23802	9473	2255	1921	928	7953	221478	840	14685	6454	518	15559	1505	17604	2378	346650
U E L	170	1932	166	852	280	1661	77	94	2078	807	1510	23300	2599	1003	39	19	102	51	36588
Vancou	18	60324	8522	9859	7918	18253	2964	1722	42473	14213	23632	473294	86954	8037	1174	2476	3405	2420	767735
C B D	95	14988	4793	3572	2807	15037	1445	1143	10934	6250	2155	87056	34662	6834	649	866	1375	430	195032
W Van	36	2530	957	133	467	17766	107	134	1175	514	1040	7801	6935	43887	18	88	140	667	84418
W Rock	59	614	130	791	233	33	21	24	682	15107	25	1179	659	18	8979	35	1238	400	30168
MRidge	0	3144	4803	547	1815	290	3147	995	516	1529	19	2303	1064	39	59	59402	1238	648	81596
Langly	38	2924	1016	1654	1583	650	384	179	1874	17680	124	3374	1546	160	982	1358	87333	3475	126314
Extern	18	925	384	1018	272	705	68	40	499	2032	85	1583	253	491	275	590	3678	1438	14336
Total	2278	321226	140275	139375	94257	199145	53616	28209	259130	344573	36853	766257	197954	84328	30467	81438	126005	179152	923301

Transit Modes

From/To	Belcar	Burn	Coquit	Delta	New W	N Van	Pt Coq	PtMood	Rich'd	Surrey	U E L	Vancou	C B D	W Van	W Rock	MRidge	Langly	Extern	Total
Belcar	0	0	0	0	18	0	0	0	0	28	0	0	0	0	0	0	0	0	46
Burn	0	9997	1087	249	1960	453	163	265	229	601	306	6275	3541	101	49	18	0	20	25714
Coquit	17	1069	2602	0	521	0	322	542	19	90	43	306	1132	0	0	19	0	0	6682
Delta	0	234	0	1156	198	0	0	0	336	424	78	959	1650	0	0	0	0	0	5035
New W	0	1664	618	210	2233	0	84	115	107	860	46	574	1075	18	43	0	72	0	7719
N Van	17	522	0	45	16	8751	0	0	34	39	358	1456	4201	898	0	0	0	0	16337
Pt Coq	0	148	307	0	84	0	744	69	0	0	79	200	315	0	0	0	0	0	1946
PtMood	17	325	584	0	136	0	112	1099	0	41	0	81	224	0	0	0	0	0	2619
Rich'd	0	193	20	230	101	53	0	0	4945	157	199	2212	1936	38	0	0	0	0	10084
Surrey	29	547	109	506	920	85	0	20	140	6836	51	1250	1280	40	760	18	190	0	12781
U E L	0	233	27	133	92	350	46	0	279	50	41	5069	940	189	0	0	0	0	7439
Vancou	18	5930	608	1063	591	1550	171	41	2291	1224	5020	57438	26438	642	179	38	83	180	103505
C B D	0	4522	1266	1613	1045	3828	388	293	2330	1912	653	26317	8527	1091	294	54	142	0	54275
W Van	0	83	0	0	0	736	0	0	20	57	168	554	1073	1556	0	16	0	0	4263
W Rock	0	82	0	0	33	0	0	0	16	644	0	218	307	0	179	0	34	0	1513
MRidge	0	0	0	0	0	0	0	0	0	19	0	0	19	0	0	159	0	0	197
Langly	0	37	0	0	54	0	0	0	0	145	0	0	0	0	19	0	144	0	399
Extern	0	19	0	0	0	0	0	0	0	0	0	21	22	0	0	0	0	0	62
Total	98	25605	7228	5205	8002	15806	2030	2444	10746	13127	7042	102920	53080	4573	1523	322	665	200	260616

Table 8

Origin - Destination Table

24 Hour Total All Trip Purposes

3.1.2.2 Time of Day

Table 9 presents a further breakdown of travel composition by time of day. An example helps to explain the notation shown in bold in the table: in the morning peak period (6:46-9:15), 30% of travel is to school, of which 41% is by automobile (drivers and passengers of cars, light trucks, motorcycles and taxis), 18% is by bus (transit and school bus), and 41% is by walk or bicycle.

Table 10 presents travel composition results from the trip diary survey. The travel purposes shown are combinations of the purpose categories allowed for in the diary questionnaire. The diary did not ask the respondent to indicate whether he or she is a transit captive, but it did ask whether a car was available for each reported trip. These specifications, together with inspections of the household's car ownership and the person's age whether he or she had a driver's licence, were used to identify transit captivity.

A further comparison of results from the telephone and trip diary surveys is shown in Tables 11 and 12. Table 11 shows, in relative terms, the extent of travel by trip purpose as reported in the two surveys. Table 12 shows, in relative terms, the extent of reported travel by time period in the two surveys.

Table 9
Travel Composition Results
1985 Metropolitan Vancouver Origin-Destination Survey

	24 HOURS	EARLY AM 00:01-06:45	AM PEAK 06:46-09:15	MID DAY 09:16-15:30	PM PEAK 15:31-18:00	EVENING 18:01-24:00
Extent of Travel:						
% of total daily travel	100%	4%	20%	36%	20%	20%
Modal Shares:						
% of travel by automobile	81	87	73	77	84	93
% by transit, school bus	8	10	11	8	10	3
% by walk and bicycle	10	3	16	14	6	3
Travel Purpose:						
To Work 1	15	65	43	7	3	2
2	84/11/5	85/12/3	84/12/5	84/8/6	82/9/9	91/4/5
During Work	3	1	2	6	1	1
	97/1/2	95/2/2	98/1/1	97/1/2	95/2/3	98/1/1
To School	8	3	**30**	2	1	1
	46/17/37	62/33/5	**41/18/41**	59/17/14	79/18/3	89/5/4
To Leisure	15	5	7	15	15	27
	89/4/6	93/2/5	89/4/7	85/6/9	90/4/6	94/2/4
To Shopping	8	-	1	13	6	6
	85/7/8		85/7/8	82/8/10	89/5/6	96/2/2
To Personal Business	4	1	3	8	3	2
	88/7/5	93/3/4	87/9/4	86/8/6	91/5/4	97/1/1
To Return Home	42	22	6	43	65	57
	79/9/12	93/3/3	91/2/7	67/11/22	81/12/7	92/4/4
Other	6	1	8	5	6	5
	98/-/1	100/-/-	98/1/1	98/-/-	99/-/-	99/-/-

1 Columns sum to 100%, apart from rounding
2 Automobile+Truck+Motorcycle+Taxi/Transit+School Bus/Walk+Bicycle

Table 10
Travel Composition Results From Trip Diary Survey

AM PEAK 6:46 to 9:15							
MODE	PURPOSE						
	HB[1] WORK	HB SHOP	HB SCHOOL	HB OTHER	NHB [2]	UNKNOWN	TOTAL
Auto Passenger	4.36%	0.42%	8.27%	2.76%	1.71%	0.10%	17.62%
Auto Driver	32.55%	1.50%	4.26%	21.28%	10.36%	0.49%	70.45%
Transit Captive	3.73%	0.17%	3.77%	0.66%	0.63%	0.03%	9.00%
Transit Choice	1.81%	0.07%	0.59%	0.35%	0.10%	0.00%	2.93%
Total	42.46%	2.16%	16.89%	25.05%	12.81%	0.63%	100.0%
PM PEAK 15:31 - 18:00							
MODE	PURPOSE						
	HB WORK	HB SHOP	HB SCHOOL	HB OTHER	NHB	UNKNOWN	TOTAL
Auto Passenger	2.50%	2.42%	2.08%	7.64%	4.92%	0.06%	19.61%
Auto Driver	18.21%	8.65%	1.52%	23.01%	20.01%	0.51%	71.90%
Transit Captive	3.34%	0.90%	0.87%	0.90%	1.10%	0.00%	7.11%
Transit Choice	1.04%	0.11%	0.03%	0.14%	0.03%	0.03%	1.38%
Total	25.09%	12.08%	4.50%	31.69%	26.05%	0.59%	100.00%
ALL DAY							
MODE	PURPOSE						
	HB WORK	HB SHOP	HB SCHOOL	HB OTHER	NHB	UNKNOWN	TOTAL
Auto Passenger	2.10%	2.18%	3.15%	7.43%	5.04%	0.12%	20.02%
Auto Driver	15.51%	7.77%	2.56%	24.77%	21.03%	0.62%	72.26%
Transit Captive	1.95%	0.75%	1.52%	1.12%	0.97%	0.04%	6.35%
Transit Choice	0.72%	0.13%	0.20%	0.25%	0.07%	0.01%	1.37%
Total	20.27%	10.83%	7.42%	33.58%	27.11%	0.78%	100.00%

(1) Home Based
(2) Non-Home Based

Table 11
Trip Purpose

PURPOSE	DIARY RESULTS		TELEPHONE SURVEY
to work	12.0%		15.1%
during work	3.4%		3.0%
to school	5.9%		7.6%
to leisure	10.7)%	14.3%	15.2%
to eat out	3.6)%		
to shopping	11.6%		7.5%
to personal business	8.8%		4.3%
to home	37.7%		41.6%
to serve passengers	5.3%		5.7%
TOTAL	100.0%		100.0%

Table 12
Reported Departure Time

TIME PERIOD		DIARY RESULTS	TELEPHONE SURVEY
Early Morning	0:01 - 06:45	3.8%	4.1%
AM Peak	06:46 - 09:15	15.9%	20.5%
Mid Day	09:16 - 15:30	41.5%	36.2%
PM Peak	15:31 - 18:00	20.1%	20.4%
Evening	18:01 - 24:00	18.7%	18.8%
TOTAL		100.0%	100.0%

3.1.3 Trip Generation

3.1.3.1 Factors to be Considered When Comparing Telephone Survey Trip Rates to Diary Trip Rates

The trip diary survey was intended to provide a "richer" data base for trip generation and mode split analysis, and generally to validate or adjust the results of the telephone interview survey. The following factors, however, must be taken into consideration when comparing the two survey's results:

(i) method-based differences derived from the survey design and methodology. The telephone survey obtained some "self-reported" trip data and some "reported by others" data; the diary survey results were "self reported".

(ii) completeness of results. In the telephone survey the interviewer ensured that every person in the sampled households was accounted for, such that there are no missing pieces in the profiles of respondents. In the diary survey, data was only obtained from persons aged six or older. (Children aged five and younger where about 7% of persons in the sampled households.) More important were the instances where no travel data was returned from persons who probably should have provided such data. At about 10%, these non-responders have unknown socio-demographic and trip-making characteristics.

(iii) distinguishing null responses from non-responses. In the telephone survey, care could be taken to ensure the completeness of responses and to distinguish between null responses and non-responses. This attention to detail was not possible in the trip diary survey, with the result that it is difficult to distinguish null responses from missing specifications.

3.1.3.2 Trip Rates Per Household

Initial inspections of the trip diary results identified some special adjustments that are necessary to use the results.

One inspection of diary results showed that per person and per household trip rates were not sensitive to the municipality of residence of respondents, such that results need not be stratified on this dimension.

A second inspection identified a "reporting diligence fall-off" in diary results. Namely, with three sets of three-day diaries that "overlapped" on Wednesdays and Fridays, results for these two days would be "Day 1" results for some households and "Day 3" results for other households. Through regression-based analysis, it was shown that "Day 3" per household trip rates were about 0.6 trips lower on each of these two days than corresponding "Day 1" trip rates.

A third inspection of the diary results related to "Day of the Week" effects. Regression-based analysis showed that, after adjusting for "Day 3" effects, per household trip rates were about the same for Tuesdays, Wednesdays, Thursdays and Saturdays. Relative to these rates, households made approximately one less trip on Mondays, one more trip on Fridays, and one and one-half fewer trips on Sundays.

Overall, total trip rates per household per day as reported in the diary survey can best be "explained" by the equation noted below, derived by regression analysis. These results suggest that comparisons between trip rates of the diary survey and trips rates from the telephone survey can best be made when the diary results are from the mid week period and exclude "Day 3" results.

Household trips per day (across all days)	**= 0.57**	**+ 0.98 x Number of vehicles**
		+ 1.82 x Number in households
		+ 0.57 x Full-time employed
		- 1.02 if Monday
		+ 1.16 if Friday
		- 1.42 if Sunday
		- 0.57 if Day 3

Tables 13 and 14, respectively, compare AM peak period and 24-hour household trip rates from the diary and telephone surveys for 16 household categories/ groupings. The following observations can be made:

(i) Looking at 24-hour trip rates, total diary trip rates are typically higher than corresponding telephone trip rates. This is also the case for individual trip purposes excepting the HB Work trip where the telephone survey rates are higher.

Table 13
Comparison Of Trip Rates From Diary and Telephone Interview Surveys
(AM Peak 6:00-8:59)

HOUSEHOLD CATEGORY(1)			TRIP PURPOSE									
			HB[2] WORK		HB EDUCATION		HB OTHERS		NHB		TOTAL	
P	W	A	D[3]	T[3]	D	T	D	T	D	T	D	T
1+	0	0	0.000	0.002	0.146	0.040	0.042	0.021	0.000	0.002	0.188	0.065
1+	1+	0	0.500	0.409	0.071	0.072	0.071	0.038	0.036	0.014	0.679	0.533
1	0	1+	0.028	0.006	0.028	0.029	0.056	0.037	0.000	0.004	0.111	0.076
1	1	1+	0.375	0.550	0.000	0.006	0.070	0.043	0.047	0.027	0.500	0.626
2	0	1+	0.000	0.005	0.041	0.030	0.284	0.100	0.000	0.005	0.324	0.140
2	1	1+	0.360	0.510	0.061	0.081	0.272	0.145	0.246	0.055	0.965	0.792
2	2+	1+	0.889	1.007	0.028	0.029	0.243	0.133	0.222	0.082	1.382	1.251
3+	0	1+	0.000	0.036	0.400	0.498	0.400	0.417	0.200	0.068	1.000	1.019
3	1	1	0.250	0.485	0.200	0.284	0.250	0.303	0.050	0.102	0.750	1.175
3	1	2+	0.400	0.558	0.075	0.209	0.125	0.260	0.050	0.094	0.650	1.121
3	2+	1	0.769	0.854	0.192	0.189	0.231	0.401	0.154	0.204	1.346	1.649
3	2+	2+	0.671	1.093	0.184	0.184	0.276	0.278	0.263	0.138	1.408	1.693
4+	1	1	0.400	0.520	0.450	0.437	0.400	0.382	0.200	0.153	1.450	1.492
4+	1	2+	0.400	0.633	0.520	0.661	0.520	0.545	0.016	0.127	1.600	1.965
4+	2+	1	0.550	0.900	0.250	0.531	0.750	0.375	0.450	0.207	2.000	2.013
4+	2+	2+	0.953	1.138	0.582	0.612	0.500	0.436	0.400	0.191	2.435	2.377

Table 14
Comparison Of Trip Rates From Diary and Telephone Interview Surveys
(24 Hours)

HOUSEHOLD CATEGORY(1)			TRIP PURPOSE									
			HB[2] WORK		HB EDUCATION		HB OTHERS		NHB		TOTAL	
P	W	A	D[3]	T[3]	D	T	D	T	D	T	D	T
1+	0	0	0.000	0.006	0.333	0.108	1.542	0.747	0.313	0.117	2.208	0.978
1+	1+	0	0.906	1.076	0.281	0.217	1.031	0.849	0.563	0.351	2.781	2.493
1	0	1+	0.075	0.017	0.100	0.099	1.900	1.512	1.025	0.397	3.300	2.025
1	1	1+	0.977	1.188	0.031	0.047	1.391	1.170	1.258	0.881	3.680	3.285
2	0	1+	0.000	0.019	0.162	0.081	3.514	2.757	1.054	0.526	4.784	3.383
2	1	1+	1.167	1.285	0.228	0.226	3.079	2.305	1.658	0.913	6.289	4.278
2	2+	1+	2.257	2.455	0.167	0.106	2.757	1.983	1.993	1.109	7.188	5.652
3+	0	1+	0.083	0.166	1.333	1.205	4.250	4.234	1.833	1.073	7.500	6.631
3	1	1	1.400	1.307	0.600	0.501	3.100	3.059	1.850	1.183	7.050	6.140
3	1	2+	1.200	1.418	0.425	0.563	3.700	3.954	1.075	1.324	6.475	7.258
3	2+	1	1.962	2.281	0.423	0.423	2.654	3.054	1.769	1.299	6.885	7.056
3	2+	2+	2.000	2.748	0.592	0.511	3.474	3.286	2.566	1.489	8.737	8.034
4+	1	1	1.400	1.345	1.150	1.054	3.350	4.257	1.350	1.237	7.350	7.892
4+	1	2+	1.160	1.491	1.360	1.573	4.740	6.176	2.230	2.004	9.580	11.244
4+	2+	1	1.950	2.509	0.650	1.202	4.900	3.488	1.500	1.346	9.100	8.545
4+	2+	2+	2.747	3.150	1.465	1.436	5.429	4.535	3.418	1.687	13.076	10.807

(1) Persons Per Household
Workers per Household
Autos Per Household

(2) Home Based

(3) Diary
Telephone Interview

(ii) For the AM peak period, total diary trip rates are typically higher than corresponding telephone trip rates, although telephone trip rates are typically higher than diary rates for the HB Work and HB Education trips.

(iii) The results confirm a superiority of the trip diary method in obtaining data on trips made away from the home location and for trips of "lesser importance" (e.g. HB Others).

(iv) The results confirm the adequacy - even superiority - of the telephone interview method in obtaining data on "important" trips. That is, trips between home and work and home and school are typically habitual, easily remembered, well known to all household members and hence well reported in telephone interviews, and of course, these trips dominate travel demand in the morning peak.

The inference that the differences between telephone survey and trip diary results relate mainly to off-peak, non-home-based trip making is reinforced by results presented in Table 11 and 12. These tables show, in relative terms, the greater importance of off-peak travel and "incidental" trip-making in the diary results.

Further insight into the source of differences between the telephone interview and trip diary results was derived from inspections of reported trip rates per person. In essence, travel data obtained from the trip diary survey is all "self reported" whereas the telephone survey included both "self reported" and "reported by others" data. Accordingly, a sample of the telephone survey results were inspected to distinguish "self reported" from "reported by others" responses. Reported trip rates per person (on a 24-hour basis, for all modes, for all purposes) were then compared after first grouping the responses into identical age and sex categories. Table 15 presents the results of this analysis.

In the telephone survey, "self reporters" averaged 3.3 trips per person per day, while "reported by others" averaged 2.6 trips per person per day; the overall average was 2.9 trips per person per day. In the diary results, the average was 3.5 trips per person per day. Regression-based analysis showed the following differences to be statistically significant:

- minus 0.69 trips per person per day when the data is "reported by others" in the telephone survey;

- minus 0.40 trips per person per day in the diary results reported by men aged 40 or older;

- minus 0.25 trips per person per day in the "self reported" telephone survey results from women aged 50 or older.

Table 16 presents reported trip making per person per day, stratified by the age of the respondent and by journey mode and purpose, as obtained by the telephone interview survey. The results quantify and confirm some basic expectations about the changing nature and amount of our transportation consumption as we age. Given the overall net aging that Greater Vancouver population is experiencing, these results point to growth in future 24-hour travel demand at a somewhat slower pace than that of overall population growth.

Table 15
Reported Trip Rates Per Person

AGE OF RESPONDENT	DIARY		TELEPHONE "SELF"		TELEPHONE "OTHER"	
	M	F	M	F	M	F
13-19	3.45	3.40	n/a	n/a	2.85	2.75
20-29	3.60	3.80	3.55	3.90	2.85	2.70
30-39	4.05	4.15	3.80	3.95	3.05	2.90
40-49	3.60	3.80	3.85	3.95	3.05	2.45
50-64	2.75	3.45	3.30	2.95	2.60	2.05
65+	2.05	2.65	2.45	2.20	2.05	2.00

Table 16
24-Hour Trip Rates
(Per Person)

	AGE CATEGORY							
	1-4	5-14	15-24	25-34	35-44	45-54	55-64	65+
NUMBER IN SURVEY	4,029	7,853	10,279	12,178	10,091	6,879	5,612	6,833
NUMBER OF TRIP-MAKERS	2,271	6,527	8,788	10,356	8,686	5,483	4,009	3,627
HOME-BASED[1] BY VEHICLE[2]								
HB Work	0.003	0.004	0.729	0.924	0.995	0.945	0.609	0.061
HB School	0.142	0.550	0.713	0.088	0.040	0.018	0.016	0.006
HB Leisure, Shop, Personal Business	1.257	0.534	0.957	0.887	0.910	0.819	0.978	1.024
HB Serve Pass	0.005	0.003	0.118	0.292	0.432	0.223	0.132	0.060
HB Total [3]	1.409	1.092	2.547	2.242	2.448	2.066	1.779	1.158
NON-HOME-BASED BY VEHICLE	0.326	0.164	0.305	0.602	0.671	0.508	0.379	0.206
ALL TRIPS BY OTHER MODES	0.140	1.048	0.404	0.186	0.135	0.109	0.118	0.167
TOTAL:ALL MODES ALL PURPOSES	1.875	2.304	3.256	3.029	3.254	2.683	2.275	1.531

1 HB Work, for example, includes Home-Work and Work-Home.
2 Includes Auto Driver, Auto Passenger and Transit Passenger.
3 Includes other Home-Based trips not reported here.

3.2 The Survey of Travel for Work and Business Purposes

As noted in Section 2.5, the telephone interview recording form was "flagged" if the household contained one or more persons who travel for work or business purposes and if data on those trips was not being provided in the interview. These persons include delivery persons, artisans such as plumbers, electricians and TV repairpersons, and sales agents. It was felt that the telephone survey might identify a representative sample of such persons, even though they (or the other household members being interviewed) might not be willing or able to list all their business-related trips.

A total of 820 household were flagged, to be mailed the one-day travel diary forms and related explanatory material as shown in Appendix pages D-1 and D-2. It was recognized that a high response rate from these households would be needed in order to provide useful results. It was also acknowledged that the representativeness of the 820 flagged households could not be confirmed; for example, StatCan's occupation codes explicitly identify delivery persons but do not distinguish "stationary" plumbers from "itinerant" plumbers. Nevertheless, in view of its modest cost, and because a high response rate was expected from people who had previously cooperated in the telephone survey, the business travel survey was undertaken.

Unfortunately, only 120 usable responses were returned, being insufficient to derive useful measures of the origins and destinations of business-related travel, and as noted, the representativeness of the original sample and realized results cannot be confirmed. With these provisions, the raw results of the survey are presented in the Appendix pages F-1 and F-2. The tables presented there show the extent of commercial/business trip making by vehicle type, the temporal pattern of this trip-making, and the distances that are driven by commercial vehicles performing different functions.

3.3 SkyTrain Rider Survey

The examination of the results of the SkyTrain Rider Survey has focused on the following areas:

(a) Rider Characteristics - age, sex car availability.

(b) Travel Characteristics - access mode to and from SkyTrain, walking distance, trip purpose, trip frequency, parking.

(c) SkyTrain Impacts - previous mode, travel time, residential location, shopping habits.

(d) Attitudes to SkyTrain - regarding reliability, vehicle crowding, speed, noise, safety, staff, transferring, ticket machines, etc.

3.3.1 Rider Characteristics

The results from the SkyTrain Rider Survey and the Vancouver Metropolitan Travel Survey undertaken in 1985 identify a profile of SkyTrain riders compared with that of transit riders in general on the Vancouver Regional Transit System.

The results of the survey with respect to age, sex and car availability are shown in Table 17.

Table 17
Rider Characteristics

		SkyTrain Riders	All Transit Riders
Sex	Male	37.2%	40.7%
	Female	62.8%	59.3%
Age Group (Years)	15 or less	4.4%	9.8%
	16-20	12.0%	18.7%
	21-30	33.7%	26.0%
	31-40	21.4%	13.5%
	41-50	11.6%	8.6%
	51-60	8.6%	7.2%
	Over 60	8.3%	16.2%
Car Availability	Available	43.2%	20.5%
	Not Available	56.8%	79.5%

It was found that the sex profile of SkyTrain riders corresponded closely to that of transit riders as a whole. With respect to age, however, SkyTrain riders tend to be drawn from the middle age groups (21-50 years) with lower proportions of the young (under 21) and over 60. A higher proportion of SkyTrain riders (43.2% compared to 20.0%) tend to have a car available and are therefore not "captive" transit riders.

3.3.2 Travel Characteristics

As shown in Table 18, SkyTrain riders tend to use the system for the work trip to a greater extent than transit riders as a whole.

Table 18
Comparison of Trip Purposes

Trip Purpose	SkyTrain Riders	All Transit Riders
Work	63.8%	40.9%
School	8.7%	27.8%
Shopping	7.7%	12.5%
Personal Business	8.4%	6.8%
Social Recreational	6.9%	8.0%
Other	4.5%	4.0%
Total	100.0%	100.0%

SkyTrain riders were asked how they travelled to a SkyTrain station and from a station to their destination. The most popular access modes to a SkyTrain station were bus (43.2%) and walk (39.7%) but an unexpectedly high 16.6% came by car including 7.7% who drove and parked, and 8.9% who were dropped off by car.

In response to the question where "park-and-riders" had parked, the majority (65.1%) responded that they parked free on local streets while 12.5% responded that they parked in a parking lot. Their principal reasons for not using connecting bus service were that it was too infrequent and too slow.

The survey also asked how far SkyTrain riders walked to a station, as an indicator of the size of the catchment area. The results showed that 95% of SkyTrain riders walked up to 9 blocks. For bus riders, most studies have shown that the 95th percentile is reached at 4 blocks.

3.3.3 SkyTrain Impacts

SkyTrain has had a significant impact on the travel patterns of its users. The high level of service offered by SkyTrain has attracted a large number of formerly private vehicle drivers. Only 56% of SkyTrain riders formerly used transit for their trip, and for 19.1% the private vehicle was their previous mode. A further 20.3% responded that they did not make this trip prior to SkyTrain.

The attractiveness of SkyTrain appears to be largely due to travel time savings for users over their previous mode. Almost two thirds (62.8%) of SkyTrain riders responded that their travel time had decreased relative to that of their previous mode, while for 16.5% it has increased. For 20.7%, travel time was the same as before.

SkyTrain has also had an impact on rider's residential location and shopping area choices.

Since the start of SkyTrain service 26.1% of riders had moved their residence. Of those respondents who had moved since SkyTrain began operation 49.3% responded that accessibility to SkyTrain was a factor in choosing the location of their place of residence. Similarly 27.7% responded that they had changed their shopping habit due to SkyTrain. These results indicated that SkyTrain could have a strong potential to influence residential location and shopping decisions and thus future development.

3.4 SkyTrain Parking Inventory

3.4.1 Pre-SkyTrain Parking Availability

The results of the pre-SkyTrain field surveys established the baseline level of parking demand for later comparison with the two post SkyTrain surveys. The baseline results are shown for nine stations in the Appendix pages G-1 to G-4 and are summarized in Table 19.

Table 19
Pre-SkyTrain Parking Survey
Parking Availability Summary

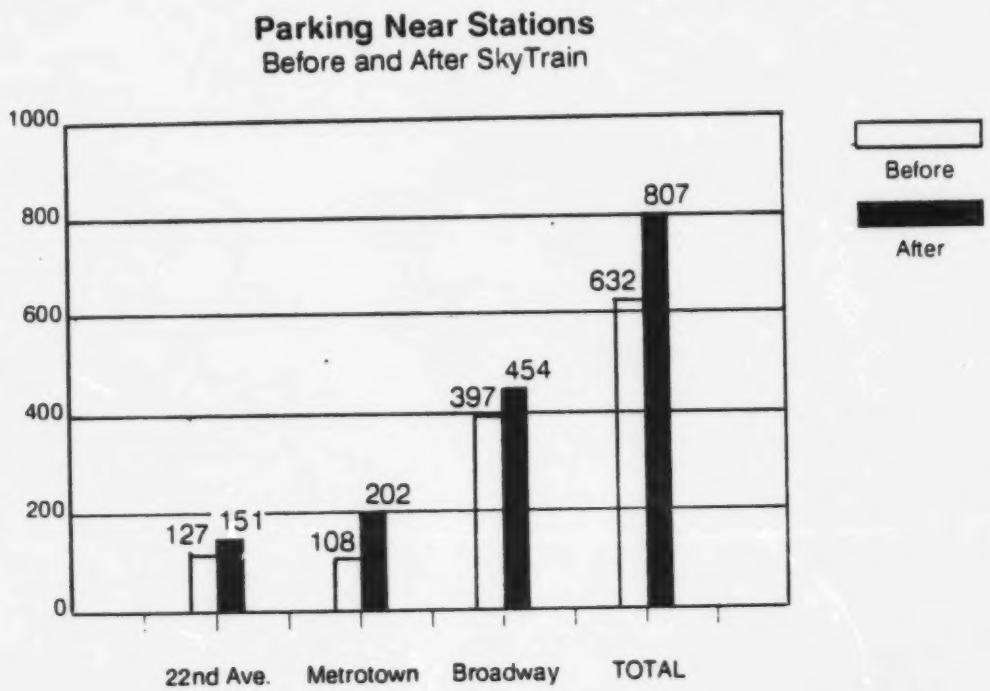
Station	Total Available	Parking Type		Parking Charges		
		On Street	Off Street	Free	Meter	Ticket
New West.	6,444	36.6%	63.4%	64.4%	7.2%	28.4%
22nd Street	3,568	82.3%	17.7%	100.0%	0.0%	0.0%
Royal Oak	6,379	76.0%	24.0%	100.0%	0.0%	0.0%
Metrotown	6,309	33.3%	66.7%	96.2%	0.0%	3.8%
Patterson	3,377	55.0%	45.0%	88.9%	9.9%	1.2%
Joyce	5,781	67.1%	32.9%	100.0%	0.0%	0.0%
29th Avenue	4,466	69.1%	30.9%	100.0%	0.0%	0.0%
Nanaimo	4,943	63.4%	36.6%	100.0%	0.0%	0.0%
Broadway	5,636	54.1%	45.9%	93.9%	1.9%	4.2%
Total	46,903	58.1%	41.9%	93.0%	2.0%	5.0%

These results show that within a 700m radius of SkyTrain stations there are approximately 46,900 available parking spaces. The majority (58.1%) are on-street parking spaces rather than off-street in a residential carport or parking lot and 93% are free of charge rather than meter or ticket parking. Only four of the nine stations have pay parking notably New Westminster station which is located in the downtown area of New Westminster.

3.4.2 Post SkyTrain Parking Utilization

Parking utilization i.e. the number of vehicles actually parked in SkyTrain station areas was surveyed for the pre-SkyTrain and post-SkyTrain periods. The differences between the number of vehicles parked in the vicinity of SkyTrain stations before and after SkyTrain indicates additional vehicles attracted to park-ride opportunities near SkyTrain stations. Figure 5 compares the number of vehicles parked within 200m of selected SkyTrain stations prior to January 1986 when SkyTrain began operation and in March 1986 just prior to Expo 86.

Figure 5



A catchment area of 200 metres was derived from the SkyTrain Rider Survey which found that 95% of park-ride users of SkyTrain parked within 200 metres of a SkyTrain station. The results show an increase of 175 vehicles parked in the vicinity of three stations, 22nd Street, Metrotown and Broadway, 27.6% more than were parked there prior to SkyTrain.

4. TRAVEL BASELINE

4.1 Baseline Definition

In order to evaluate SkyTrain impacts it was necessary to develop a rational and meaningful definition of the term "impact".

Impact implies significant change and presupposes that the extent of change can be carefully measured. This raises the question, "How can this change be measured and what portion of measured changes can be attributed to SkyTrain?".

The notion of baseline was introduced as a rational approach for measuring changes due to SkyTrain. In essence, a baseline condition reflects the 'normal' condition which would occur in the absence of a new transportation facility. Various concepts of baseline conditions were examined to determine the most practical one for measuring SkyTrain impacts.

If, for example, traffic volume with SkyTrain is defined as X, the baseline (BL) traffic volumes can be defined as the difference between X and either of two baseline conditions.

BL_0 - 1985 conditions

BL_1 - regional trend in traffic volumes assuming no SkyTrain ie. bus only transit system.

As show in Figure 6, it is then possible to define the change from the baseline conditions (X - BL) as either of the following:

(a) $X - BL_0$ - change from conditions identified in 1985 prior to SkyTrain.

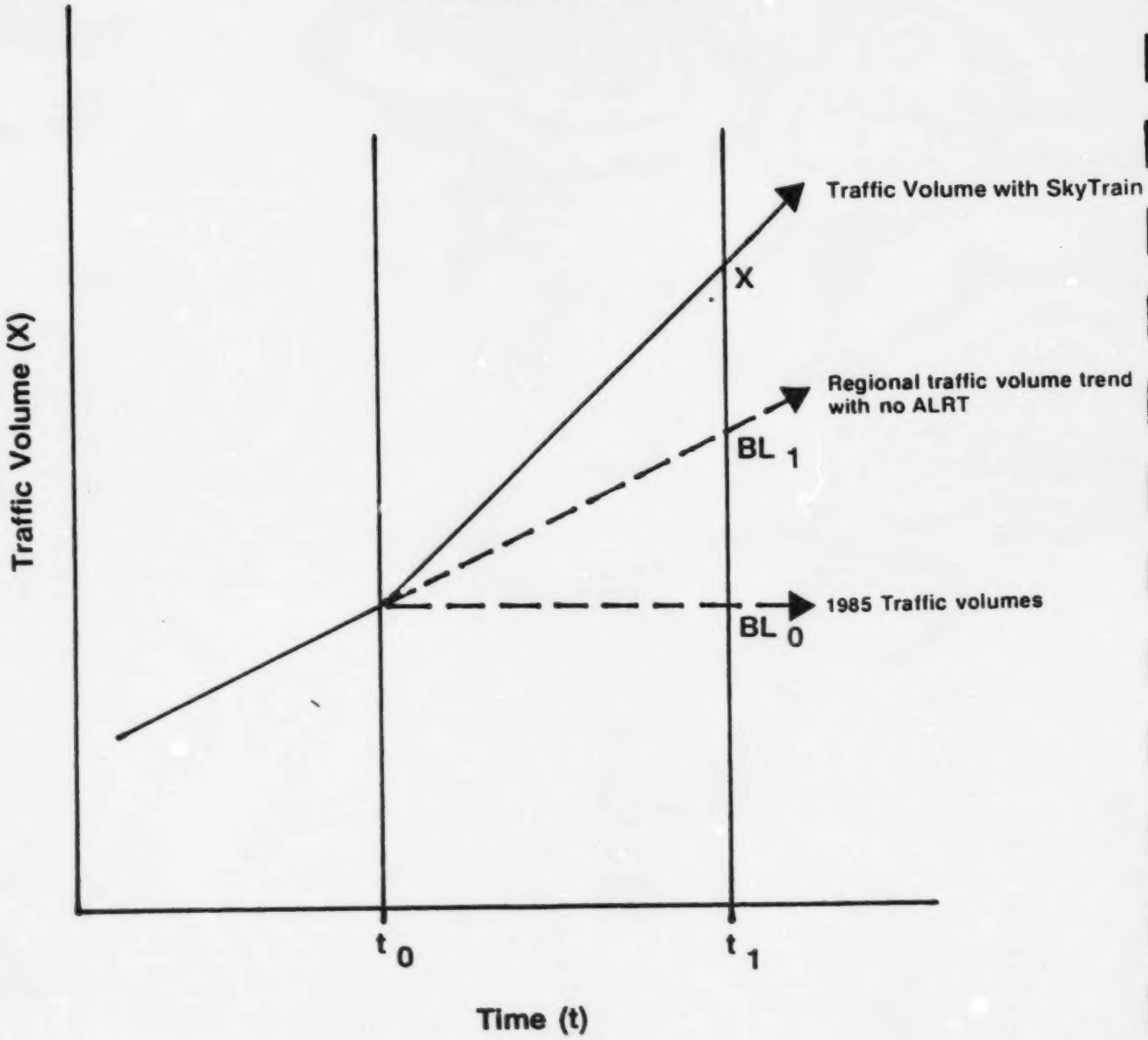
(b) $X - BL_1$ - change from future conditions based on the regional trend assuming no SkyTrain.

For the purposes of the ALRT Impact Assessment the concept of $(X - BL_1)$ and in some cases $(X - BL_0)$ will be used to define the change due to SkyTrain. The $(X - BL_1)$ condition, while moderately difficult to estimate, has the advantage of distinguishing the change due to regional trends from the change accruing as a result of SkyTrain. This is especially important where follow-up surveys would not be undertaken for some time after the introduction of SkyTrain.

In cases, however, where regional trends may only become manifest in the long term or where follow-up studies would not be possible except after some years of SkyTrain operation, current conditions may suffice as a reasonable baseline. Thus $(X - BL_0)$ would provide a satisfactory definition of a change in baseline conditions due to SkyTrain.

Figure 6

Alternate Baseline Definitions



4.2 Baseline Travel Conditions

The ALRT Impact Assessment establishes various baseline characteristics of the urban transportation system in the Vancouver Region. The following identifies the basic components of the travel baseline:

(a) Travel Demand,
(b) Transit Ridership,
(c) Parking Demand.

Each of these components is described in the following sections.

4.2.1 Travel Demand

4.2.1.1 Zone-to-Zone Trip Tables

The demand of Greater Vancouver residents to travel between areas of the region, as indicated by trip tables, is largely based on land use patterns. The impact of SkyTrain on trip desires would only become manifest over a long period if the increased accessibility offered by SkyTrain influences individual choices on residential location and work place. For example, Table 8 shows the 24-hour intermunicipal origin-destination tables for all modes and the transit mode, and provides baseline data for a 1985 pre-SkyTrain condition.

4.2.1.2 Traffic Volumes

Traffic volumes crossing regional screenlines were surveyed prior to the opening of SkyTrain. The results are available in the G.V.R.D. report "Vehicle and Passenger Screenline Survey." This report provides baseline information on private vehicle and transit volumes across regional screenlines in 1985 for comparison with screenline counts undertaken in subsequent years. Figure 4 was taken from this report.

Initial comparison between transit volumes collected by the 1985 survey and those collected in a follow-up screenline survey conducted in November 1986 are provided in Figures 7 and 8. These figures compare 1985 and 1986 transit volumes for the AM Peak period and PM peak period respectively. The results show that SkyTrain has contributed to a substantial increase in transit ridership on the Boundary Road (south) and Main Street screenlines. During the AM peak period (from the start of service to 9:30 am) transit ridership across the Boundary Road screenline increased by almost 140% from 2180 passengers in 1985 to 5194 passengers in 1986 after SkyTrain began operation. Evening (PM) peak period ridership increased by almost 160% from 2191 to 5671 passengers. At the Main Street screenline into downtown Vancouver ridership increased by almost 25% during the AM peak period from 12,010 in 1985 to 14,982 passengers in 1986, and by almost 22% during the PM peak period from 11,755 passengers in 1985 to 14,328 passengers in 1986.

4.3 Parking Demand

As shown in the Appendix the SkyTrain Parking Inventory collected baseline data on parking characteristics in the vicinity of SkyTrain stations. Follow-up studies will be necessary within a relatively short time to provide the most reliable comparisons, however, as land use changes would introduce intervening variables to affect parking demand.

4.4 Mode Split and Transit Ridership

4.4.1 Mode Split

Results from the Metropolitan Vancouver Travel Survey provide a profile of mode choice in the Vancouver region by time period as of 1985. These results provide a baseline to compare with results of future surveys of mode choice to identify the impact of SkyTrain.

4.4.2 Annual System Ridership

The impact of SkyTrain on overall system ridership can only be determined based on the difference between the regional ridership trends without SkyTrain relative to the regional ridership trends with SkyTrain.

A comparison of system annual ridership using 1985 and 1986 actual ridership and estimates for the period from 1987 to 1996 is shown in Figure 9. Comparing the annual system ridership for the SkyTrain/bus system with the bus only (no SkyTrain) scenario indicates that the Phase I line is expected to attract an additional 6.6 million annual transit trips in 1987 and 1988. With the SkyTrain (Phase II) Surrey extension beginning operation in 1990, annual ridership is expected to be 9.2 million greater than it would be without SkyTrain. Future surveys and ridership counts will be used to confirm or modify these estimates.

5. SUMMARY AND CONCLUSIONS

In overview, the results and achievements of the ALRT Impact Assessment: Baseline Travel Survey can be grouped into four main categories.

First, the exercise has achieved a comprehensive body of information on travel in the Greater Vancouver region prior to the introduction of SkyTrain. To measure SkyTrain's impact, future surveys can obtain measures of travel demand, mode split, transit ridership and parking demand, for comparison with the pre-SkyTrain conditions. Other follow-up studies, including forecasting exercises using the G.V.R.D.'s regional travel demand model, may also be used to estimate post-SkyTrain conditions, and to help distinguish between the impacts of regional growth and the impacts solely due to SkyTrain.

A second, more general benefit is that the data compiled in the baseline travel surveys has improved the understanding of travel in Greater Vancouver, and can be used in a variety of specific and general applications. In particular, the data has helped in the calibration of regional and municipal transportation models which can now cover a more complete range of travel purposes and time periods than was previously possible.

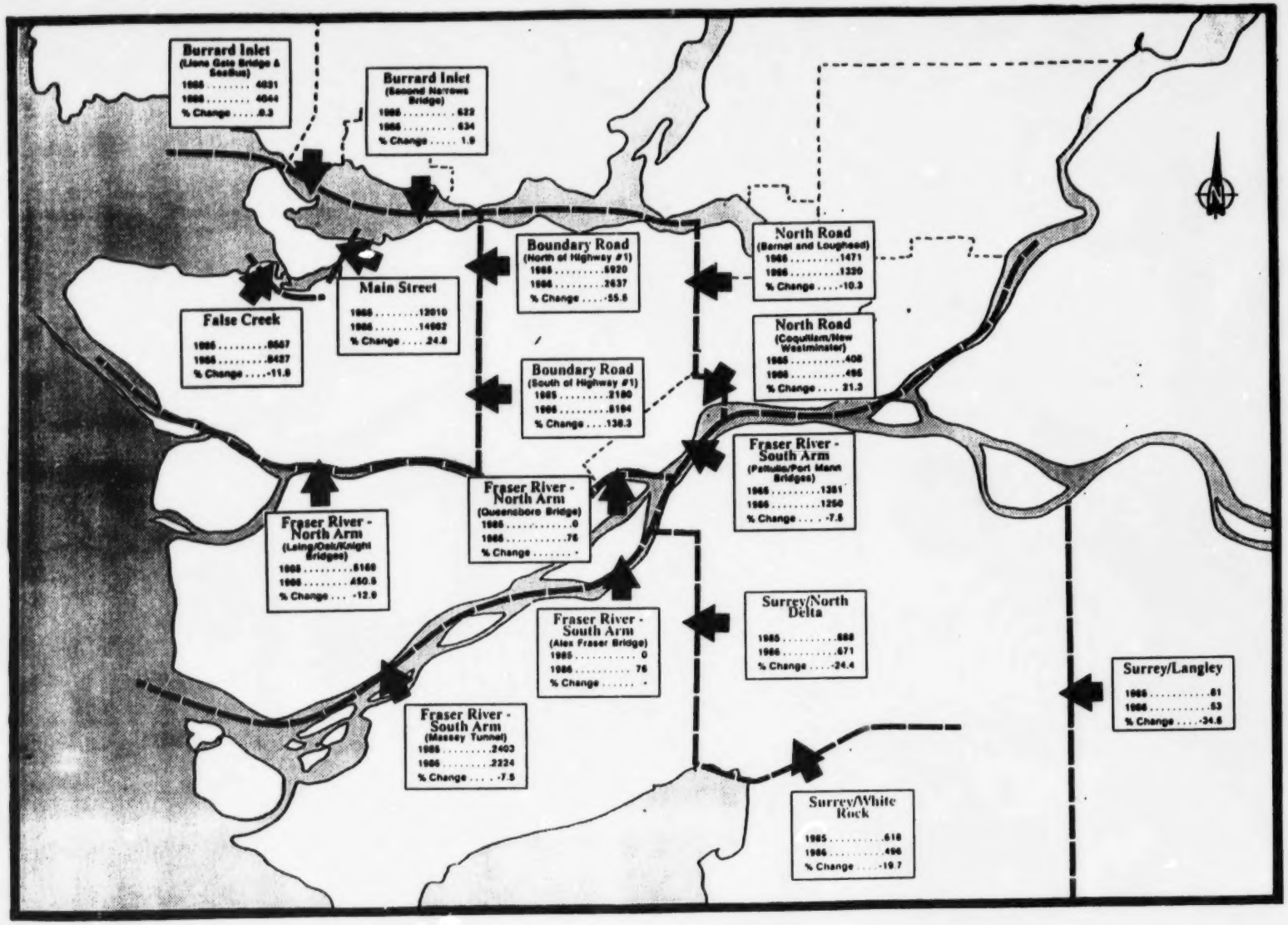


Figure 7

Screenline Transit Volumes - A.M. Peak

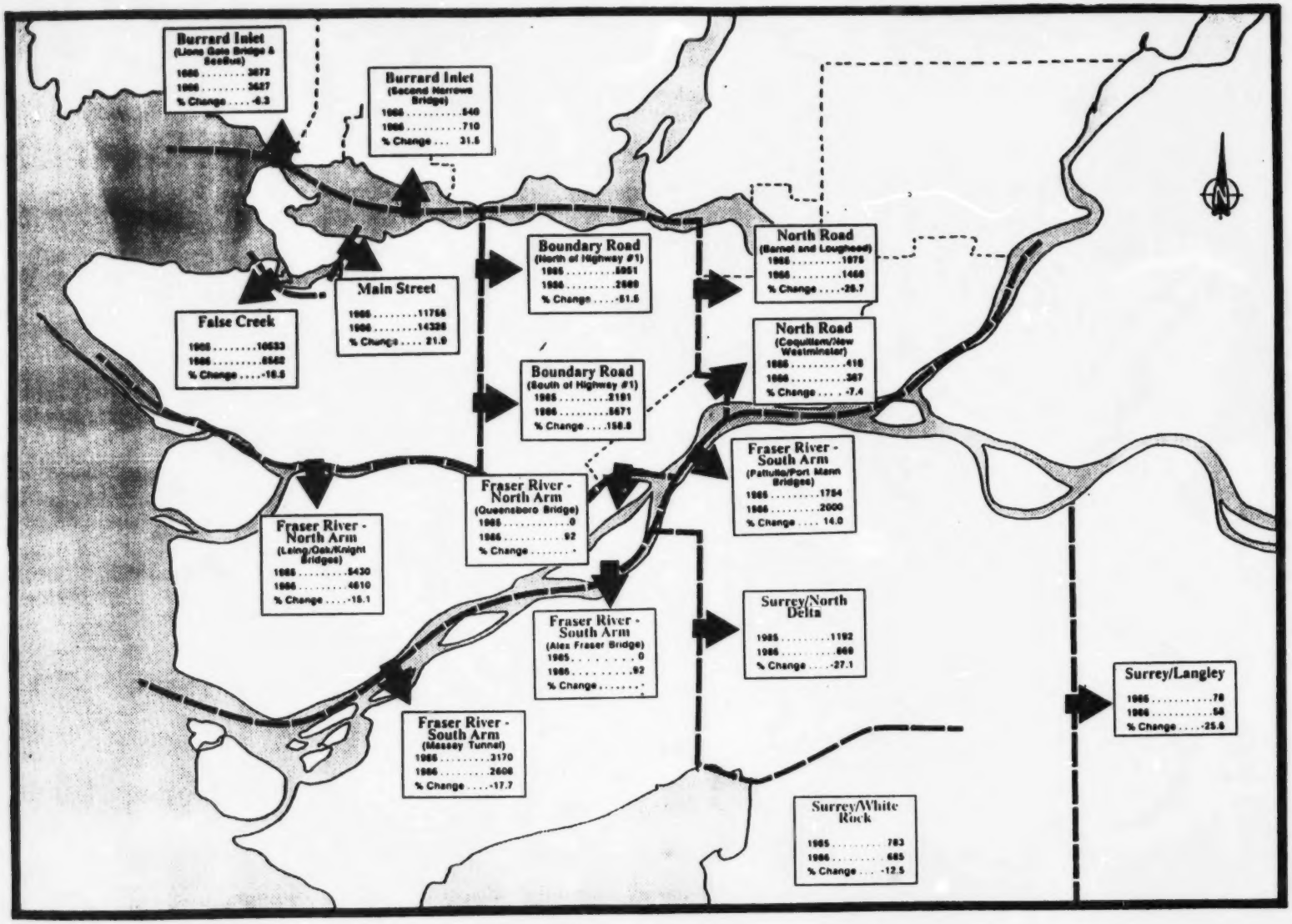


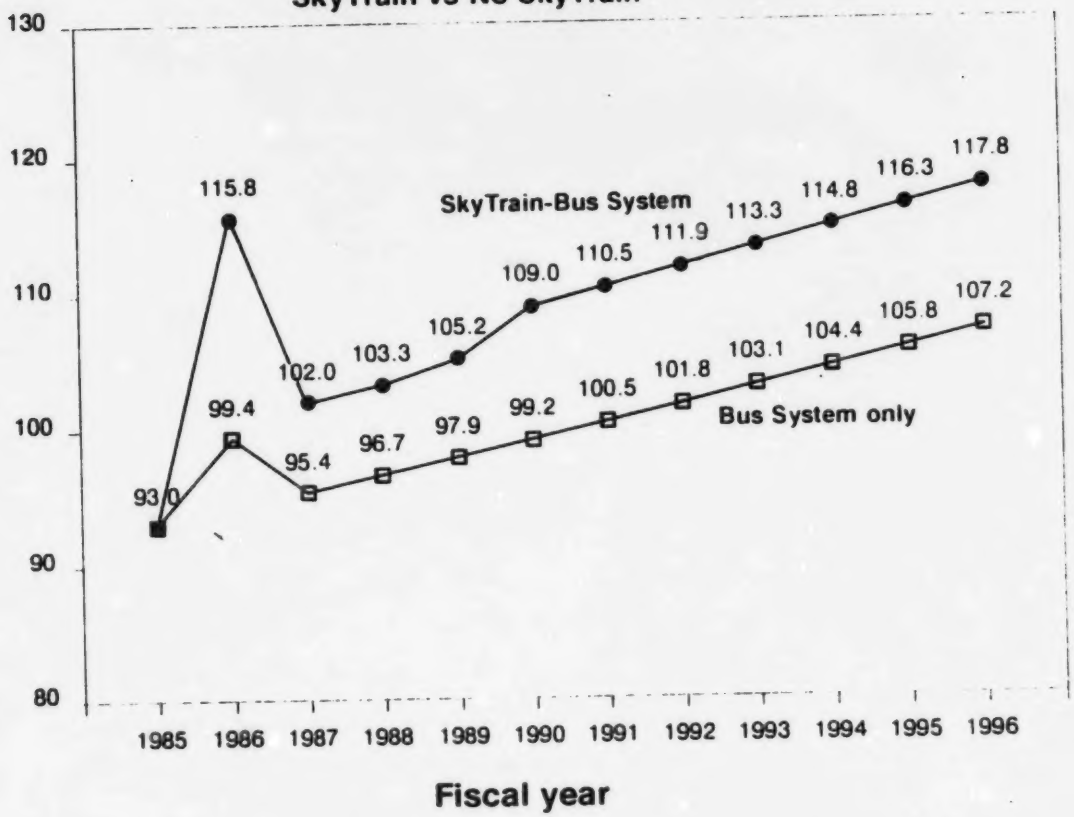
Figure 8

Screenline Transit Volumes - P.M. Peak

Figure 9

Estimated Annual Transit Ridership

SkyTrain vs No SkyTrain



Third, the results of the data collection, as well as the experiences of the study teams in organizing and executing the travel surveys, may provide useful guidelines to those in other areas. This includes those who may be seeking to compare various indices with corresponding ones from their area, or those who may be considering how they might conduct their own travel survey. The main report provides additional survey results and descriptions of survey methods that are useful for these applications.

The travel survey exercise achieved an authoritive database on urban travel in Greater Vancouver, which in turn was used in the achievement of well-founded and commonly-accepted calibrations of regional and municipal travel demand forecasting models. In Greater Vancouver, responsibility for transportation planning is split among several jurisdictions. Thus, it is important that ways be found to help these jurisdictions "work from the same script" and to help them cooperate and coordinate their activities one with the other. The travel survey exercise is an example of and model for the successful cooperation of these jurisdictions. The products of the exercise are a foundation for future consensus-building, planning and joint action.

REFERENCES

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3. Metropolitan Vancouver Comprehensive Travel Survey: Report on Phase Two - Survey Implementation, September 1985, by David Baxter, GVRD Development Services Department.

4. 1985 Metropolitan Vancouver Origin-Destination Survey: Vehicle and Passenger Screenline Survey, April 1987, GVRD Development Services Department.

5. 1985 Metropolitan Vancouver Origin-Destination Survey: Summary of Household and Travel Demand Statistics, May 1987, GVRD Development Services Department.

6. 1985 Metropolitan Vancouver Origin-Destination Survey: Inter-Municipal Travel Patterns, August 1987, GVRD Development Services Department.

7. Preliminary Results: 1985 Metropolitan Vancouver Origin- Destination Survey, November 1986, by D. Peterson, GVRD Development Services Department.

8. Proposal for a Regional Travel Survey discussion paper presented to Transit Technical Committee, November 1983, BC Transit

9. Assessment of Data Needs, discussion paper presented to Data Needs Subcommittee of the Transit Technical Committee, January 1984, BC Transit.

APPENDIX

THE METROPOLITAN VANCOUVER ORIGIN-DESTINATION SURVEY

SURVEY CODE : 39730 TELEPHONE 327-7007

DATE : MARCH 30TH, 1987
AREA : 3009 "A1"

CITY : VAN HC
POSTAL CODE : V5Y 2B7

HOUSEHOLD INFORMATION
NO OF MOTOR VEHICLES: 02
TOTAL PEOPLE IN HOUSEHOLD: 02
TOTAL WORKING: 01

NUM	NAME	AGE	SEX
01		25	0
02		27	0

INTERVIEWER I.D 50

RECORD OF CALL: CALL TIME 1750 | DATE 11 21 | RESULT H

COMPLETION STATUS 1 | DATE FINISH 1.1.20

PERSON NO	ORIGIN DESCRIPTION: ADDRESS 1	ADDRESS 2	MONUMENT 3	MUNICIPALITY CODE	SEC ID	TRIP NO	DEPARTURE TIME	PURPOSE OF TRIP	TRAVEL MODE USED	BUS ROUTE USED	DIRECTION	TRIP DESTINATION/SEGMENT CHANGE LOCATION: ADDRESS 1	ADDRESS 2	MONUMENT 3	MUNICIPALITY CODE	SEC ID	COMMENTS DELIVERY TRUCKING FAXIBUS
	H											132 st./76 av			12	2	
01				14	3	01	0700				1	Park Royal S			15	3	
						02	1030				1	13/Lonsdale			07	2	
						03	1200				1	Westview SC			07	3	
						04	1300				1	AMBLESIDE			15	4	Amerlside
						05	1400				1	2000 W Broad			14	1	
						06	1500				1	Hwy H			14	3	
						07	1700				1	Coquitlam			03	3	
						08	1750				1	H			14	3	
						09	2130				1						
	H										1	Cottonwood S			40	3	
02				14	3	01	1030				1	C					
						02	1430				1	200 st.			32	4	
						03	1530				1	Brunette/Mar mot			03	2	
						04	1700				1	H			14	3	

A-1

TELEPHONE SURVEY CODING FORM

PRELIMINARY DIARY QUESTIONS

YOUR FIRST NAME: _____ ☐ Female ☐ Male

YOUR AGE:

- ☐ 6 to 12 years of age
- ☐ 13 to 19 years of age
- ☐ 20 to 29 years of age
- ☐ 30 to 39 years of age
- ☐ 40 to 49 years of age
- ☐ 50 to 64 years of age
- ☐ 65 years or over

EMPLOYMENT OUTSIDE THE HOME:

- ☐ Full time (20 hours per week or more)
- ☐ Part time (less than 20 hours per week)
- ☐ Not employed outside the home

DRIVER'S LICENCE:

- ☐ Yes, I have a valid driver's licence
- ☐ No, I don't have a valid driver's licence

SPECIALIZED TRIP INFORMATION:

Do you have a job where you make commercial deliveries of goods, messages or people?

- ☐ Yes
- ☐ No

Do you use transportation services that are specialized for the handicapped?

- ☐ Yes
- ☐ No

IN WHICH INDUSTRY ARE YOU EMPLOYED?

- ☐ Not employed outside the home
- ☐ Student
- ☐ Agriculture
- ☐ Forestry
- ☐ Fishing and trapping
- ☐ Mining, quarry, oil and gas wells
- ☐ Manufacturing
- ☐ Construction
- ☐ Transportation
- ☐ Communications and Utilities
- ☐ Retail, Wholesale, and Services
- ☐ Finance, Insurance and Real Estate
- ☐ Public administration and defence
- ☐ Community Services - including education and health

YOUR TOTAL ANNUAL INCOME:

Which category bests indicates *Your* Total Annual Income?

- ☐ Not employed for pay
- ☐ Less than $9,999 per year
- ☐ $10,000 to $19,999 per year
- ☐ $20,000 to $29,999 per year
- ☐ $30,000 to $39,999 per year
- ☐ $40,000 to $49,999 per year
- ☐ $50,000 to $59,999 per year
- ☐ $60,000 or more per year

HOUSEHOLD QUESTION SHEET

1. How many people, including yourself, are living in your household?

   THE NUMBER IN THE HOUSEHOLD IS _____
   THE NUMBER UNDER 6 YEARS OF AGE IS _____

2. How many household members are employed outside the home?
   (Consider 20 hours per week to be "full-time")

   THE NUMBER FULL-TIME IS _____
   THE NUMBER PART-TIME IS _____

3. Which description best fits your home?

   - ☐ Single detached house
   - ☐ Side-by-side duplex
   - ☐ Up-down duplex
   - ☐ Row house or Townhouse
   - ☐ Apartment in a building of less than 5 stories
   - ☐ Apartment in a building of more than 5 stories
   - ☐ Mobile home
   - ☐ Other (specify) _____

4. Do you own or rent your home?

   - ☐ Own
   - ☐ Rent

5. How many vehicles do members of your household have for personal use?
   (Include cars, vans and light trucks — not collection/hobby vehicles)

   THE NUMBER OF VEHICLES IS _____
   THE NUMBER OF MOTORCYCLES AND SCOOTERS IS _____

6. Please fill in the Make, Model, Year and Distance Driven for each vehicle.
   (It does not matter which one you fill in as "Vehicle 1")

	MAKE	MODEL	YEAR	Distance Driven in last 12 months MILES ☐ KMs ☐	IF OWNED LESS THAN 12 MONTHS: Months Owned MONTHS	Distance Driven MILES ☐ KMs ☐
Example	Ex	Ame	2x	12345		
VEHICLE 1						
VEHICLE 2						
VEHICLE 3						
VEHICLE 4						
VEHICLE 5						
VEHICLE 6						

PRELIMINARY DIARY QUESTION SHEETS

TRIP DESCRIPTION PAGE

1. DAY OF THE WEEK: _____ 2. TRIP NUMBER: _____

3. DEPARTURE TIME: _____ ☐ before noon ☐ afternoon

4. DESTINATION: _____
(Street Address/Intersection/Land Mark) (City)

5. TRIP PURPOSE:

☐ Going to work
☐ Part of my work
☐ To school or training
☐ Leisure or social
☐ Going shopping
☐ Personal business
☐ going to eat out
☐ _____ (Other, please specify)
☐ Giving someone a ride
☐ Accompanying driver
☐ Going home

6. How many children under 6 accompanied you on this trip? _____

7. MODES OF TRAVEL FOR THE TRIP:

Was all or part of this trip by auto (car, van or light truck)? ☐ NO ☐ YES ..then please complete **A** below

Was all or part of this trip by Public transit bus or sea bus? ☐ NO ☐ YES ..then please complete **B** below

Check any other modes used for this trip:
☐ Motorcycle or scooter
☐ Bicycle
☐ Taxi
☐ Commercial Vehicle
☐ Walking
☐ Other _____

B-2

A. COMPLETE IF PART OR ALL WAS BY AUTO (Car, Van or Light Truck)

1. Make and year of vehicle? _____

2. Were you? ☐ the driver ☐ a passenger

3. Was this trip part of a regular car pool? ☐ No ☐ Yes ..How many people including yourself are in the car pool? _____

4. Did you park the auto at the same address as your destination?
☐ Yes ☐ No, I parked and walked _____ minutes to my destination. ☐ No, I was dropped off
☐ No, I changed to another mode at: (Address) _____ (City) _____

5. How much did you pay for parking?
☐ I did not pay for parking
☐ I paid part or all of the parking; it cost me $ _____ (☐ per trip, ☐ per day, ☐ per week, ☐ per month, ☐ per year)

B. COMPLETE IF PART OR ALL WAS BY PUBLIC TRANSIT

1. Where did you catch the bus?
Address _____ City _____

2. How did you get to the bus stop? ☐ Walked ☐ By auto and parked near by ☐ Got a ride

3. What was the bus route name(s) or number(s)?
_____ _____

4. Where did you end your bus ride?
Address _____ City _____

5. How did you pay your bus fare? ☐ Cash ☐ Fare saver ticket ☐ Bus pass

6. Was there an auto available that you could have used for this trip? ☐ Yes ☐ No

(When you left this destination, where did you go? Continue on next page) ➡

TRIP DESCRIPTION PAGE

1. DAY OF THE WEEK. _____ 2. TRIP NUMBER: _____

3. DEPARTURE TIME: _____ ☐ before noon ☐ afternoon

4. DESTINATION: _____
(Street Address/Intersection/Land Mark) (City)

5. TRIP PURPOSE.

☐ Going to work
☐ Part of my work
☐ To school or training
☐ Leisure or social
☐ Going shopping
☐ Personal business
☐ going to eat out
☐ _____ (Other, please specify)
☐ Giving someone a ride
☐ Accompanying driver
☐ Going home

6. How many children under 6 accompanied you on this trip? _____

7. MODES OF TRAVEL FOR THE TRIP.

Was all or part of this trip by auto (car, van or light truck)? ☐ NO ☐ YES ..then please complete **A** below

Was all or part of this trip by Public transit bus or sea bus? ☐ NO ☐ YES ..then please complete **B** below

Check any other modes used for this trip.
☐ Motorcycle or scooter
☐ Bicycle
☐ Taxi
☐ Commercial Vehicle
☐ Walking
☐ Other _____

A. COMPLETE IF PART OR ALL WAS BY AUTO (Car, Van or Light Truck)

1. Make and year of vehicle? _____

2. Were you? ☐ the driver ☐ a passenger

3. Was this trip part of a regular car pool? ☐ No ☐ Yes ..How many people including yourself are in the car pool? _____

4. Did you park the auto at the same address as your destination?
☐ Yes ☐ No, I parked and walked _____ minutes to my destination. ☐ No, I was dropped off.
☐ No, I changed to another mode at: (Address) _____ (City) _____

5. How much did you pay for parking?
☐ I did not pay for parking
☐ I paid part or all of the parking; it cost me $ _____ (☐ per trip, ☐ per day, ☐ per week, ☐ per month, ☐ per year)

B. COMPLETE IF PART OR ALL WAS BY PUBLIC TRANSIT

1. Where did you catch the bus?
Address _____ City _____

2. How did you get to the bus stop? ☐ Walked ☐ By auto and parked near by ☐ Got a ride

3. What was the bus route name(s) or number(s)?
_____

4. Where did you end your bus ride?
Address _____ City _____

5. How did you pay your bus fare? ☐ Cash ☐ Fare saver ticket ☐ Bus pass

6. Was there an auto available that you could have used for this trip? ☐ Yes ☐ No

(When you left this destination, where did you go? Continue next page) ➡

Preliminary Diary Questions

Instructions

1. The driver is asked to record all one-way trips made today (including those which begin and end in the same zone).
2. Please use the zone numbers on the map below to identify trip origin and destination points. Note that downtown Vancouver (zone 3) is a different zone from City of Vancouver (zone 4).
3. A trip is one-way travel to a destination. For example, travel from home to work is one completed trip; the next trip would then begin at the work location.
4. This information is for travel analysis only. There is no need to identify yourself by name or address.

Thank you for your cooperation.

	In which map area do you live?	ZONE ____			
	Where did your travel today begin?	ZONE ____			
TRIP 1	Where was your 1st destination?	ZONE ____	Arrival time? ____ AM ____ PM	Purpose of trip?	CODE ____
TRIP 2	Where was your 2nd destination?	ZONE ____	Arrival time? ____ AM ____ PM	Purpose of trip?	CODE ____
TRIP 3	Where was your 3rd destination?	ZONE ____	Arrival time? ____ AM ____ PM	Purpose of trip?	CODE ____
TRIP 4	Where was your 4th destination?	ZONE ____	Arrival time? ____ AM ____ PM	Purpose of trip?	CODE ____
TRIP 5	Where was your 5th destination?	ZONE ____	Arrival time? ____ AM ____ PM	Purpose of trip?	CODE ____
TRIP 6	Where was your 6th destination?	ZONE ____	Arrival time? ____ AM ____ PM	Purpose of trip?	CODE ____
TRIP 7	Where was your 7th destination?	ZONE ____	Arrival time? ____ AM ____ PM	Purpose of trip?	CODE ____
TRIP 8	Where was your 8th destination?	ZONE ____	Arrival time? ____ AM ____ PM	Purpose of trip?	CODE ____

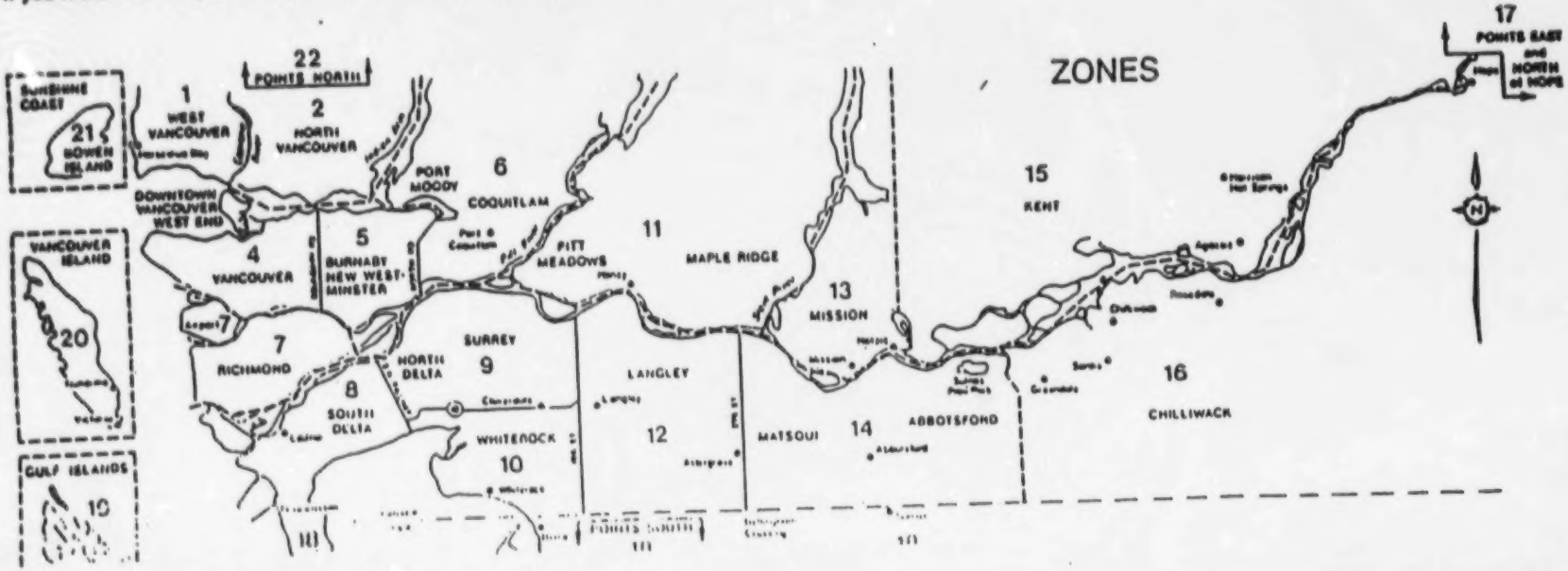
TRIP PURPOSE CODES

- A To work
- B During work
- C Education
- D Leisure
- E Shopping
- F Personal business
- G Delivery
- H To home
- I Other

Which of the above trips were you taking when you received this survey form? TRIP____

How many people were in your vehicle at that time? ____

If you made more trips than space permits please indicate the number not recorded.____



C-1

External Cordon Survey Questionnaire

SURVEY OF TRAVEL FOR WORK OR BUSINESS PURPOSES

THE METROPOLITAN VANCOUVER ORIGIN-DESTINATION SURVEY

600 - 4330 KINGSWAY, BURNABY, B.C. V5H 4G8

A

1. ON WHICH DAYS DID YOU OR WILL YOU TRAVEL FOR WORK OR BUSINESS PURPOSES?
(THESE PURPOSES COULD INCLUDE MAKING DELIVERIES, MAKING SALES OR SERVICE CALLS, OR OTHER PURPOSES. IF YOU ONLY WENT TO WORK AND CAME HOME AGAIN ON A PARTICULAR DAY, PLEASE DO NOT CHECK OFF THAT DAY.)

1 ☐ MONDAY NOV. 25 | 2 ☐ TUESDAY NOV. 26 | 3 ☐ WEDNESDAY NOV. 27 | 4 ☐ THURSDAY NOV. 28 | 5 ☐ FRIDAY NOV. 29

2. PLEASE TAKE THIS FORM TO WORK WITH YOU AND FILL IT OUT FOR ONE (1) OF THE DAYS YOU TRAVEL FOR WORK OR BUSINESS PURPOSES.
FOR WHICH DAY HAVE YOU PROVIDED INFORMATION?

1 ☐ MONDAY NOV 25 | 2 ☐ TUESDAY NOV. 26 | 3 ☐ WEDNESDAY NOV. 27 | 4 ☐ THURSDAY NOV. 28 | 5 ☐ FRIDAY NOV 29

B PLEASE TELL US ABOUT THE VEHICLE YOU DROVE.

3. WHAT TYPE OF VEHICLE DID YOU DRIVE?

1 ☐ BICYCLE OR MOTORCYCLE
2 ☐ PASSENGER CAR
3 ☐ LIGHT DUTY TRUCK OR VAN (LESS THAN 4500 KG. GVW)
4 ☐ HEAVY DUTY TRUCK WITH 2 AXLES (PLEASE SPECIFY GVW _____)
5 ☐ HEAVY DUTY TRUCK WITH MORE THAN 2 AXLES. (PLEASE SPECIFY GVW _____)

4. WHAT IS THE VEHICLE USED FOR MOST OFTEN?

1 ☐ COURIER SERVICE (MESSAGES, DOCUMENTS, SMALL PARCELS, ETC.)
2 ☐ REPAIR OR SERVICE CALLS (TV OR COMPUTER REPAIR, PLUMBER, ETC.)
3 ☐ SALES CALLS (REAL ESTATE AGENT, SALES REPRESENTATIVE, ETC.)
4 ☐ LIGHT LOAD PICK UP AND DELIVERY (BOXES, PACKAGES, ETC.)
5 ☐ HEAVY CONTAINERIZED OR PALLET LOADS
6 ☐ BULK LOADS (GASOLINE, GRAVEL, ETC.)
7 ☐ OTHER (PLEASE SPECIFY _____)

5. WHAT FUEL DOES YOUR VEHICLE USE?

1 ☐ LEADED GASOLINE
2 ☐ UNLEADED GASOLINE
3 ☐ DIESEL
4 ☐ OTHER (PLEASE SPECIFY _____)

PLEASE TURN OVER AND COMPLETE THE TRIP DIARY

D PLEASE ENTER ANY COMMENTS YOU MAY HAVE IN THE SPACE BELOW

_____

_____

_____

_____

_____

THANK YOU FOR YOUR ASSISTANCE. PLEASE MAIL BACK YOUR COMPLETED FORM IN THE ENVELOPE PROVIDED. IF WE RECEIVE YOUR COMPLETED FORM POSTMARKED NO LATER THAN THURSDAY, DECEMBER 5, WE WILL MAIL YOU TWO (2) EXPO 86 "SCRATCH AND WIN" LOTTERY TICKETS.

THE PERSON IN YOUR HOUSEHOLD WE ORIGINALLY CONTACTED WAS.

SHOULD WE MAIL THE LOTTERY TICKETS TO THE PERSON ON THE LABEL?
☐ YES ☐ NO PLEASE COMPLETE THE FOLLOWING

NAME _____

ADDRESS _____

CITY _____ POSTAL CODE _____

(FRONT)

TRIP DIARY

C PLEASE PROVIDE INFORMATION ABOUT EACH TRIP YOU MAKE FOR WORK OR BUSINESS PURPOSES. PLEASE INCLUDE SUCH TRIPS AS GOING TO LUNCH THAT ARE MADE DURING YOUR WORKING DAY. PLEASE TELL US THE PLACE AND TIME THAT YOUR FIRST TRIP BEGAN. FOR TRIP ONE (1) AND ALL OTHER TRIPS, PLEASE TELL US THE PLACE AND TIME THAT THE TRIP ENDS. ALSO, AT EACH STOP, PLEASE TELL US HOW LONG YOU STAYED.

PLEASE INDICATE EITHER AN ADDRESS OR THE NEAREST INTERSECTION OR THE NAME OF THE BUILDING (SEARS, BENTALL 2 ETC.) ALSO PLEASE INDICATE THE MUNICIPALITY. HERE ARE SOME EXAMPLES:

TRIP	LOCATION OF TRIP END		ARRIVAL TIME		TIME STAYED
17	GRANVILLE & 12th	VANCOUVER	1:45	☐ AM ☒ PM	15 MIN
18	SEARS	BURNABY	2:30	☐ AM ☒ PM	20 MIN
19	500 4th Avenue	NEW WEST	3:10	☐ AM ☒ PM	10 MIN

6. MILEAGE READING BEFORE START OF FIRST TRIP: _____ ☐ MILES ☐ KILOMETERS

7. TIME AND PLACE OF START OF FIRST TRIP:

_____ : _____ ☐ AM ☐ PM _____ LOCATION _____ CITY

OFFICE USE	TRIP NO.	LOCATION OF TRIP END: ADDRESS / INTERSECTION / BUILDING	MUNICIPALITY	ARRIVAL TIME		TIME STAYED
	1				☐ AM ☐ PM	
	2				☐ AM ☐ PM	
	3				☐ AM ☐ PM	
	4				☐ AM ☐ PM	
	5				☐ AM ☐ PM	
	6				☐ AM ☐ PM	
	7				☐ AM ☐ PM	
	8				☐ AM ☐ PM	
	9				☐ AM ☐ PM	
	10				☐ AM ☐ PM	
	11				☐ AM ☐ PM	
	12				☐ AM ☐ PM	
	13				☐ AM ☐ PM	
	14				☐ AM ☐ PM	
	15				☐ AM ☐ PM	
	16				☐ AM ☐ PM	
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	26				☐ AM ☐ PM	
	27				☐ AM ☐ PM	
	28				☐ AM ☐ PM	
	29				☐ AM ☐ PM	
	30				☐ AM ☐ PM	
	31				☐ AM ☐ PM	
	32				☐ AM ☐ PM	
	33				☐ AM ☐ PM	

8. MILEAGE READING AT END OF LAST TRIP: _____ ☐ MILES ☐ KILOMETERS

PLEASE TURN OVER AND COMPLETE THE REMAINING PORTION OF THIS FORM SO YOUR EXPO 86 "SCRATCH AND WIN" LOTTERY TICKETS CAN BE MAILED TO YOU!

(BACK)

1. What time did you receive this questionnaire?

   Please write time: _____ am or pm

2. Which SkyTrain station did you board at?

   Please name station _____

3. Where did you start this trip?

   _____

   (Please give nearest intersection, building name or street address)

4. How did you get to the SkyTrain station?

   1. Bus
   2. Walk
   3. Drove car and parked
   4. Dropped off by car
   5. Other; please specify

   _____

5. If you took a bus to SkyTrain, which route(s) did you take?

   1st BUS Route Number _____ and

   Route Name _____

   2nd BUS Route Number _____ and

   Route Name _____

6. If you walked to SkyTrain, how many blocks? *Please write number of blocks.*

   _____

7. Which SkyTrain station will you get off at? *Please name station.*

   _____

8. What is your final destination?

   _____

   (Please give nearest intersection, building name, or street address)

9. How will you get to your final destination?

   1. Walk
   2. Bus; please give Route Numbers/Names

   _____

   3. SeaBus
   4. Other; Please specify

   _____

10. What is the main reason for this trip?

    1. Work
    2. Shopping
    3. School
    4. Personal Business
    5. Social/Recreational
    6. Other; Please specify

    _____

11. Was a car available for this trip?

    1. YES 2. NO

12. If you could have used a car for this trip why didn't you?

    1. Cost too much.
    2. Scarce parking.
    3. Heavy traffic.
    4. Transit more convenient.
    5. Other; Please specify.

    _____

13. Will you *(or did you)* use SkyTrain to ride in the opposite direction today?

    1. NO
    2. YES; Please approximate time of day: _____ am or pm

14. If YES and you are returning by SkyTrain, will you transfer to a bus to reach your final destination?

    1. YES 2. NO

15. In total, how many transit trips will you make TODAY on *(please write number of trips in space)*

    1. SkyTrain _____ 3. Sea Bus _____

    2. Bus _____

16. Which days did you use SkyTrain last week? *Please circle all that apply.*

    1. Sunday
    2. Monday
    3. Tuesday
    4. Wednesday
    5. Thursday
    6. Friday
    7. Saturday

17. Please indicate how many one way trips you took on SkyTrain last week. *(e.g. from home to work = 1 trip, from work to home = 1 trip)*

    _____ trips last week

18. Before SkyTrain how did you make this trip?

    1. Bus; please give Route Numbers/Names _____

    _____

    2. Car
    3. Walk
    4. Did not make this trip before SkyTrain
    5. Other; Please specify.

    _____

19. Compared with your means of travel before SkyTrain started, has travel time to your destination...

    1. Increased by about _____ minutes

    2. Decreased by about _____ minutes

    3. Remained about the same as before.

Answer questions 20 and 21 if you used a car or other private vehicle to travel to SkyTrain today.

20. Do you usually park...

    1. On local streets?
    2. Free of charge in a nearby lot/garage?
    3. In a nearby lot/garage and pay?

21. Why don't you use connecting bus service to get to SkyTrain? *Please check all that apply.*

    1. Don't know about it.
    2. Bus route not close enough to home/work.
    3. Bus service too infrequent.
    4. Transfers are inconvenient.
    5. Bus is too slow.
    6. Bus is unreliable.
    7. Other; please specify.

    _____

22. Why don't you ride SkyTrain more often when you travel? *Please check all that apply.*

    1. More convenient to drive.
    2. More convenient to take the bus.
    3. SkyTrain is too slow.
    4. Parking at SkyTrain stations is difficult.
    5. SkyTrain stations are not conveniently located
    6. Don't travel that much.
    7. SkyTrain doesn't go where I want to go.
    8. I do ride SkyTrain often.

23. Are you...?

    1. Male 2. Female

24. What is your age? _____ years

25. Your comments about SkyTrain are valuable to us. How can we improve service for you?

    _____

    _____

    _____

    _____

    _____

    _____

SkyTrain Rider Survey - Questionnaire A

E-1

1. What time did you receive this questionnaire?

   Please write time: ____ : ____ am or pm

2. Which SkyTrain station did you board at?

   Please name station _____

3. Where did you start this trip?

   _____

   (Please give nearest intersection, building name or street address)

4. How did you get to the SkyTrain station?

   1. Bus
   2. Walk
   3. Drove car and parked
   4. Dropped off by car
   5. Other; please specify

   _____

5. If you took a bus to SkyTrain, which route(s) did you take?

   1st BUS Route Number _____ and

   Route Name _____

   2nd BUS Route Number _____ and

   Route Name _____

6. If you walked to SkyTrain, how many blocks did you walk? *Please write number of blocks.*

   _____

7. Which SkyTrain station will you get off at? *Please name station.*

   _____

8. What is your final destination?

   _____

   (Please give nearest intersection, building name, or street address)

9. How will you get to your final destination?

   1. Walk
   2. Bus; please give Route numbers/names _____
   3. SeaBus
   4. Other; Please specify

   _____

10. What is the main reason for this trip?

    1. Work
    2. Shopping
    3. School
    4. Personal Business
    5. Social/Recreational
    6. Other; Please specify

    _____

11. Was a car available for this trip?

    1. YES 2. NO

12. Will you *(or did you)* use SkyTrain to ride in the opposite direction today?

    1. NO
    2. YES; Please approximate time of day:

    _____ am or pm

13. If YES and you are returning by SkyTrain, will you transfer to a bus to reach your final destination?

    1. YES 2. NO

14. In total, how many transit trips will you make TODAY on... *(please write number of trips in space)*

    1. SkyTrain _____
    2. Bus _____
    3. SeaBus _____

15. Please indicate how many one way trips you took on SkyTrain last week. *(e.g. from home to work = 1 trip; from work to home = 1 trip)*

    _____ trips last week

16. Which days did you use SkyTrain last week? *Please circle all that apply.*

    1. Sunday
    2. Monday
    3. Tuesday
    4. Wednesday
    5. Thursday
    6. Friday
    7. Saturday

17. Have you moved your home since SkyTrain began operation (January 1986)?

    1. YES
    2. NO

18. If YES, was accessibility to SkyTrain a factor in choosing the location of your place of residence?

    1. YES
    2. NO

19. Have you changed your shopping habits due to SkyTrain?

    1. YES
    2. NO

20. If YES, how have your shopping habits changed?

    _____

    _____

    _____

22. Are you...?

    1. MALE 2. FEMALE

23. What is your age?

    _____

24. Your comments about SkyTrain are valuable to us. How can we improve service for you?

    _____

    _____

    _____

    _____

21. We would like your opinions on SkyTrain. Please circle the response closest to your views on the following statements.

	Strongly Disagree		Neutral		Strongly Agree
1. SkyTrain service is reliable.	1	2	3	4	5
2. SkyTrain cars are uncrowded.	1	2	3	4	5
3. SkyTrain is a fast mode of travel.	1	2	3	4	5
4. SkyTrain is quiet.	1	2	3	4	5
5. I feel safe on board SkyTrain.	1	2	3	4	5
6. SkyTrain staff are helpful.	1	2	3	4	5
7. Transferring from Bus to SkyTrain is convenient.	1	2	3	4	5
8. Transferring from SkyTrain to Bus is convenient.	1	2	3	4	5
9. Ticket machines are easy to use.	1	2	3	4	5
10. SkyTrain service meets my transportation needs.	1	2	3	4	5
11. SkyTrain is an asset to the community.	1	2	3	4	5

SkyTrain Rider Survey - Questionnaire B

B-2

Trip Frequency By Commerical Vehicle Type

NUMBER OF TRIPS	PASS CAR	LIGHT TRUCK	HEAVY 2-AXLE	HEAVY 3-AXLE	OVERALL
1-5	8	12	6	8	34
6-10	14	9	4	13	40
11-15	9	8	3	3	23
16-20	1	6	3	1	11
21-25	1	1	1	0	3
25-30	0	5	0	0	5
31+	1	4	0	0	4

Time Start Profile Of Commerical Travel

HOUR BEGINNING	PASS CAR	LIGHT TRUCK	HEAVY 2-AXLE	HEAVY 3+AXLE	OVERALL
0 AM	2	1	0	0	3
1	1	0	0	0	1
2	1	0	0	0	1
3	2	1	0	1	4
4	3	0	1	1	5
5	3	4	0	0	7
6	2	7	0	6	15
7	9	11	5	15	40
8	24	41	12	15	92
9	30	70	21	18	139
10	37	69	32	19	157
11	40	79	25	22	166
12 PM	41	65	28	15	149
13	27	69	25	13	134
14	40	73	21	23	157
15	34	56	7	18	115
16	24	38	7	10	79
17	5	13	3	2	23
18	2	10	4	0	16
19	4	2	3	0	9
20	2	1	1	1	5
21	3	0	2	0	5
22	2	0	0	0	2
23	0	0	1	0	1

Statistics On Vehicle Use By Class and Function

CLASS AND FUNCTION	AVG. DISTANCE DRIVEN PER DAY (kilometres)	STD. DEV'N. OF DISTANCE	NUMBER OF OBSERVATIONS
AUTOMOBILE			
Courier	122.4	95.2	8
Repair/Service	58.3	46.3	3
Sales Calls	101.2	59.2	15
Light Delivery	30.5	12.5	2
Other	190.0	98.0	2
Overall	103.8	67.6	30
LIGHT DUTY TRUCK			
Courier	78.3	46.3	4
Repair/Service	83.0	30.1	5
Sales Calls	103.0	35.4	3
Light Delivery	119.0	62.2	22
Other	102.3	50.1	4
Overall	107.3	55.8	38
HEAVY TRUCK, 2 AXLES			
Light Delivery	118.8	31.8	4
Heavy Delivery	108.6	49.2	11
Overall	111.3	45.5	15
HEAVY TRUCK, 3+AXLES			
Light Delivery	132.2	51.4	12
Heavy Delivery	151.3	42.8	4
Other	79.3	56.0	3
Overall	127.9	52.8	19

Available Parking Spaces - Summary Report

STATION	ZONE	PARKING TYPE ON	PARKING TYPE OFF	PARKING DURATION RESIDENT	PARKING DURATION EMPLOYEE	PARKING DURATION TRANSIENT	PARKING CHARGE FREE	PARKING CHARGE METERED	PARKING CHARGE TICKET	PARKING SPACES TOTAL	PARKING SPACES PERCENT	PARKING SPACES CUMULATIVE	PARKING SPACES CUMULATIVE PERCENT
RETROTOWN	0-100 metres	45	230	45	80	150	125	0	150	275	4.3	275	4.3
	101-200 metres	21	205	45	160	21	226	0	0	226	3.5	501	7.9
	201-300 metres	476	609	687	365	33	1085	0	0	1085	17.1	1586	25.1
	301-400 metres	745	1121	693	125	1068	1816	0	70	1886	29.8	3472	55.0
	401-500 metres	377	977	630	343	381	1336	0	18	1354	21.4	4826	76.4
	501-600 metres	370	996	335	75	956	1366	0	0	1366	21.6	6192	98.1
	601-700 metres	50	67	95	0	22	117	0	0	117	1.8	6309	100.0
		2104	4205	2530	1148	2631	6071	0	238	6309			
ROYAL OAK	101-200 metres	342	323	367	227	71	665	0	0	665	10.4	665	10.4
	201-300 metres	1104	62	1065	40	63	1168	0	0	1168	18.3	1833	28.7
	301-400 metres	745	214	598	0	361	959	0	0	959	15.0	2792	43.7
	401-500 metres	2019	219	1221	0	1017	2238	0	0	2238	35.0	5030	78.8
	501-600 metres	530	588	568	0	550	1118	0	0	1118	17.5	6148	96.3
	601-700 metres	108	123	180	0	51	231	0	0	231	3.6	6379	100.0
		4850	1529	3999	267	2113	6379	0	0	6379			
22ND AVENUE	0-100 metres	123	20	123	0	20	143	0	0	143	4.0	143	4.0
	101-200 metres	586	100	606	0	0	606	0	0	606	16.9	749	20.9
	201-300 metres	635	106	635	56	50	741	0	0	741	20.7	1490	41.7
	301-400 metres	709	198	815	92	0	907	0	0	907	25.4	2397	67.1
	401-500 metres	552	119	671	0	0	671	0	0	671	18.8	3068	85.9
	501-600 metres	380	89	469	0	0	469	0	0	469	13.1	3537	99.1
	601-700 metres	31	0	31	0	0	31	0	0	31	0.8	3568	100.0
		2936	632	3350	148	70	3568	0	0	3568			
NEW WESTMINSTER	0-100 metres	20	6	0	0	26	6	20	0	26	0.4	26	0.4
	101-200 metres	255	429	4	351	329	493	37	154	684	10.6	710	11.0
	201-300 metres	301	1529	0	822	1008	348	145	1337	1830	28.3	2540	39.4
	301-400 metres	615	403	166	145	707	750	130	138	1018	15.7	3558	55.2
	401-500 metres	691	719	356	288	766	1320	49	41	1410	21.8	4968	77.0
	501-600 metres	404	656	348	251	461	818	82	160	1060	16.4	6028	93.5
	601-700 metres	71	345	281	90	45	416	0	0	416	6.4	6444	100.0
		2357	4087	1155	1947	3342	4151	463	1830	6444			

Available Parking Spaces - Summary Report

STATION	ZONE	PARKING TYPE ON	PARKING TYPE OFF	PARKING DURATION RESIDENT	PARKING DURATION EMPLOYEE	PARKING DURATION TRANSIENT	PARKING CHARGE FREE	PARKING CHARGE METERED	PARKING CHARGE TICKET	PARKING SPACES TOTAL	PARKING SPACES PERCENT	PARKING SPACES CUMULATIVE	PARKING SPACES CUMULATIVE PERCENT
BROADWAY	0-100 metres	224	68	0	0	292	257	0	35	292	4.8	292	4.8
	101-200 metres	439	578	266	0	751	690	113	214	1017	16.9	1309	21.8
	201-300 metres	571	740	816	0	495	1311	0	0	1311	21.8	2620	43.6
	301-400 metres	367	546	636	60	217	913	0	0	913	15.2	3533	58.9
	401-500 metres	1195	713	1784	0	124	1908	0	0	1908	31.8	5441	90.7
	501-600 metres	329	219	480	24	44	548	0	0	548	9.1	5989	99.8
	601-700 metres	9	0	9	0	0	9	0	0	9	0.1	5998	100.0
		3134	2864	3991	84	1923	5636	113	249	5998			
HAMI[illegible]	0-100 metres	0	8	8	0	0	8	0	0	8	0.1	8	0.1
	101-200 metres	332	73	405	0	0	405	0	0	405	8.1	413	8.3
	201-300 metres	806	523	1329	0	0	1329	0	0	1329	26.8	1742	35.2
	301-400 metres	892	485	1377	0	0	1377	0	0	1377	27.8	3119	63.0
	401-500 metres	627	490	1012	105	0	1117	0	0	1117	22.5	4236	85.6
	501-600 metres	434	228	662	0	0	662	0	0	662	13.3	4898	99.0
	601-700 metres	45	0	45	0	0	45	0	0	45	0.9	4943	100.0
		3136	1807	4838	105	0	4943	0	0	4943			
29TH AVENUE	0-100 metres	249	0	249	0	0	249	0	0	249	5.5	249	5.5
	101-200 metres	217	114	331	0	0	331	0	0	331	7.4	580	12.9
	201-300 metres	264	190	454	0	0	454	0	0	454	10.1	1034	23.1
	301-400 metres	1009	490	1471	28	0	1499	0	0	1499	33.5	2533	56.7
	401-500 metres	992	339	1331	0	0	1331	0	0	1331	29.8	3864	86.5
	501-600 metres	290	245	517	0	18	535	0	0	535	11.9	4399	98.4
	601-700 metres	67	0	67	0	0	67	0	0	67	1.5	4466	100.0
		3088	1378	4420	28	18	4466	0	0	4466			
JOYCE	101-200 metres	267	297	484	20	60	564	0	0	564	9.7	564	9.7
	201-300 metres	465	6	465	6	0	471	0	0	471	8.1	1035	17.9
	301-400 metres	1101	555	1644	12	0	1656	0	0	1656	28.6	2691	46.5
	401-500 metres	939	371	1240	45	25	1310	0	0	1310	22.6	4001	69.2
	501-600 metres	875	577	1131	87	234	1452	0	0	1452	25.1	5453	94.3
	601-700 metres	233	95	281	0	47	328	0	0	328	5.6	5781	100.0
		3880	1901	5245	170	366	5781	0	0	5781			
PATTERSON	0-100 metres	18	0	18	0	0	18	0	0	18	0.4	18	0.4
	101-200 metres	150	246	317	0	79	396	0	0	396	10.4	414	10.9
	201-300 metres	180	326	345	46	115	460	0	46	506	13.3	920	24.2
	301-400 metres	467	591	530	440	288	883	375	0	1258	33.1	2178	57.3
	401-500 metres	220	285	100	15	398	513	0	0	513	13.5	2691	70.8
	501-600 metres	444	617	196	100	767	1063	0	0	1063	27.9	3754	98.8
	601-700 metres	26	18	44	0	0	44	0	0	44	1.1	3798	100.0
		1715	2083	1550	601	1639	3377	375	46	3798			

Parking Utilization - Summary Report

STATION	ZONE	AVAILABLE PARKING	UTILISED PARKING PRE-SKYTRAIN	UTILISED PARKING POST-SKYTRAIN	PARKING POST-BUS LINK	PARKING POST-EXPO 86	UTILISATION RATES PRE-SKYTRAIN	UTILISATION RATES POST-SKYTRAIN	UTILISATION RATES POST-BUS LINK	UTILISATION RATES POST-EXPO 86
BROADWAY	0-100 metres	292	46	52	0	0	15.7	17.8	0.0	0.0
	101-200 metres	1017	351	402	0	0	34.5	39.5	0.0	0.0
	201-300 metres	1311	451	494	0	0	34.4	37.6	0.0	0.0
	301-400 metres	913	338	357	0	0	37.0	39.1	0.0	0.0
	401-500 metres	1908	546	637	0	0	28.6	33.3	0.0	0.0
	501-600 metres	548	157	187	0	0	28.6	34.1	0.0	0.0
	601-700 metres	9	0	0	0	0	0.0	0.0	0.0	0.0
		5998	1889	2129	0	0	31.4	35.4	0.0	0.0
KENNARD	0-100 metres	8	2	0	0	0	25.0	0.0	0.0	0.0
	101-200 metres	405	94	0	0	0	23.2	0.0	0.0	0.0
	201-300 metres	1329	346	0	0	0	26.0	0.0	0.0	0.0
	301-400 metres	1377	320	0	0	0	23.2	0.0	0.0	0.0
	401-500 metres	1117	300	0	0	0	26.8	0.0	0.0	0.0
	501-600 metres	662	174	0	0	0	26.2	0.0	0.0	0.0
	601-700 metres	45	1	0	0	0	2.2	0.0	0.0	0.0
		4943	1237	0	0	0	25.0	0.0	0.0	0.0
29TH AVENUE	0-100 metres	249	28	0	0	0	11.2	0.0	0.0	0.0
	101-200 metres	331	73	0	0	0	22.0	0.0	0.0	0.0
	201-300 metres	454	128	0	0	0	28.1	0.0	0.0	0.0
	301-400 metres	1499	334	0	0	0	22.2	0.0	0.0	0.0
	401-500 metres	1331	295	0	0	0	22.1	0.0	0.0	0.0
	501-600 metres	535	155	0	0	0	28.9	0.0	0.0	0.0
	601-700 metres	67	5	0	0	0	7.4	0.0	0.0	0.0
		4466	1018	0	0	0	22.7	0.0	0.0	0.0
JOYCE	101-200 metres	564	135	0	0	0	23.9	0.0	0.0	0.0
	201-300 metres	471	81	0	0	0	17.1	0.0	0.0	0.0
	301-400 metres	1656	407	0	0	0	24.5	0.0	0.0	0.0
	401-500 metres	1310	342	0	0	0	26.1	0.0	0.0	0.0
	501-600 metres	1452	445	0	0	0	30.6	0.0	0.0	0.0
	601-700 metres	328	146	0	0	0	44.5	0.0	0.0	0.0
		5781	1556	0	0	0	26.9	0.0	0.0	0.0
PATTERSON	0-100 metres	18	15	0	0	0	83.3	0.0	0.0	0.0
	101-200 metres	396	109	0	0	0	27.5	0.0	0.0	0.0
	201-300 metres	506	152	0	0	0	30.0	0.0	0.0	0.0
	301-400 metres	1258	591	0	0	0	46.9	0.0	0.0	0.0
	401-500 metres	513	203	0	0	0	39.5	0.0	0.0	0.0
	501-600 metres	1063	459	0	0	0	43.1	0.0	0.0	0.0
	601-700 metres	44	8	0	0	0	18.1	0.0	0.0	0.0
		3790	1537	0	0	0	40.4	0.0	0.0	0.0

Parking Utilization - Summary Report

STATION	ZONE	AVAILABLE PARKING	UTILISED PARKING PRE-SKYTRAIN	UTILISED PARKING POST-SKYTRAIN	UTILISED PARKING POST-BUS LINK	UTILISED PARKING POST-EXPO 86	UTILISATION RATES PRE-SKYTRAIN	UTILISATION RATES POST-SKYTRAIN	UTILISATION RATES POST-BUS LINK	UTILISATION RATES POST-EXPO 86
METROTOWN	0-100 metres	275	14	17	0	0	5.0	6.1	0.0	0.0
	101-200 metres	226	92	185	0	0	40.7	81.8	0.0	0.0
	201-300 metres	1085	514	396	0	0	47.3	36.4	0.0	0.0
	301-400 metres	1886	722	1048	0	0	38.2	55.5	0.0	0.0
	401-500 metres	1354	410	482	0	0	30.2	35.5	0.0	0.0
	501-600 metres	1364	631	561	0	0	46.1	41.0	0.0	0.0
	601-700 metres	117	50	52	0	0	42.7	44.4	0.0	0.0
		6309	2435	2741	0	0	38.5	43.4	0.0	0.0
ROYAL OAK	101-200 metres	665	362	0	0	0	54.4	0.0	0.0	0.0
	201-300 metres	1168	393	0	0	0	33.6	0.0	0.0	0.0
	301-400 metres	959	254	0	0	0	26.4	0.0	0.0	0.0
	401-500 metres	2238	650	0	0	0	29.0	0.0	0.0	0.0
	501-600 metres	1118	325	0	0	0	29.0	0.0	0.0	0.0
	601-700 metres	231	90	0	0	0	38.9	0.0	0.0	0.0
		6379	2074	0	0	0	32.5	0.0	0.0	0.0
22ND AVENUE	0-100 metres	143	22	33	0	0	15.3	23.0	0.0	0.0
	101-200 metres	606	105	118	0	0	17.3	19.4	0.0	0.0
	201-300 metres	741	184	178	0	0	24.8	24.0	0.0	0.0
	301-400 metres	907	144	191	0	0	15.8	21.0	0.0	0.0
	401-500 metres	671	113	135	0	0	16.8	20.1	0.0	0.0
	501-600 metres	469	74	88	0	0	15.7	18.7	0.0	0.0
	601-700 metres	31	3	2	0	0	9.6	6.4	0.0	0.0
		3568	645	745	0	0	18.0	20.8	0.0	0.0
NEW WESTMINSTER	0-100 metres	26	18	0	0	0	69.2	0.0	0.0	0.0
	101-200 metres	684	297	0	0	0	43.4	0.0	0.0	0.0
	201-300 metres	1830	1391	0	0	0	76.0	0.0	0.0	0.0
	301-400 metres	1018	529	0	0	0	51.9	0.0	0.0	0.0
	401-500 metres	1410	661	0	0	0	46.8	0.0	0.0	0.0
	501-600 metres	1060	388	0	0	0	36.6	0.0	0.0	0.0
	601-700 metres	416	210	0	0	0	50.4	0.0	0.0	0.0
		6444	3494	0	0	0	54.2	0.0	0.0	0.0